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AIR POLLUTION

(FEDERAL AIR POLLUTION RESEARCH AND TECHNICAL ASSISTANCE PROGRAM)

HEARING

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON GOVERNMENT OPERATIONS HOUSE OF REPRESENTATIVES

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AIR POLLUTION

THURSDAY, OCTOBER 31, 1957

HOUSE OF REPRESENTATIVES,
COMMITTEE ON GOVERNMENT OPERATIONS,
INTERGOVERNMENTAL RELATIONS SUBCOMMITTEE,
Los Angeles, Calif.

The subcommittee met, pursuant to adjournment, at 10:15 a. m., in the Hall of Records, Hon. L. H. Fountain, chairman, presiding.

Present: Representatives Fountain, Dwyer, Holifield, and Lipscomb.

Also present: James R. Naughton, counsel, and Delphis C. Goldberg, professional staff member, Intergovernmental Relations Subcommittee, Committee on Government Operations.

Mr. FOUNTAIN. The committee will come to order.

Let the record show, Mr. Reporter, that a quorum is present, consisting of Congressman Holifield, Congresswoman Dwyer, and the chairman. We are very glad to have with us also Congressman Glenard Lipscomb, who is a member of the full Committee on Government Operations.

Under the rules of the House of Representatives, the Committee on Government Operations has the duty of studying the operation of Government activities at all levels with respect to economy and efficiency. That responsibility, insofar as it relates to the Department of Health, Education, and Welfare, the Public Health Service, and certain other departments and agencies, has been delegated by the full committee to its Intergovernmental Relations Subcommittee which is present here today.

In July 1955, Congress enacted the Air Pollution Research and Technical Assistance Act, Public Law 159 of the 84th Congress, which authorized the United States Public Health Service to conduct a comprehensive program of air-pollution research, technical asistance, and training.

The act authorized the expenditure of not more than $5 million annually for the fiscal years 1956 through 1960 to carry on direct activities of the Public Health Service and to make grants and award contracts to State and local air pollution control agencies, other public and private agencies and institutions, and to individuals for research, training, and demonstration projects.

I believe the appropriations for the year 1956 were a little over $1 million, and for 1957 were in the neighborhood of $2½ million.

Earlier this year, the California congressional delegation requested the Committee on Government Operations to look into the operation of Federal activities related to air pollution. That request was referred by the committee to this subcommittee. Our hearing here to-

day is at the invitation and the urging of Congressman Chet Holifield, of this fine city of Los Angeles, who is a very distinguished and able member of our subcommittee.

I should like to point out that this subcommittee does not act on legislation relating to the establishment of Federal air pollution activities, nor does it decide upon the amount of funds to be appropriated for such activities.

It is our responsibility, however, to determine whether programs authorized by the Congress are being carried out in accordance with the purpose of the legislation establishing them, and whether they are being administered with proper economy and efficiency.

At our hearing today we hope to obtain for background purposes a brief description of air pollution problems in the Los Angeles area, and the manner in which local authorities are seeking to cope with such problems.

We also expect to obtain the opinions of local authorities on the manner in which the Federal program is being administered, and their suggestions as to ways in which the efficiency and economy of the Federal program can be improved.

I might add that early next year we hope to hold an additional hearing in Washington on this subject, with witnesses from the Public Health Service and, possibly, air pollution control authorities from localities other than Los Angeles.

May I also add at this point that the members of this committee are very happy to be here in the great and beautiful city of Los Angeles, Calif. Our first witness today was scheduled to be Mayor Norris Poulson. I believe the mayor is ill and can't be here, but Colonel Herbert will present his statement.

We are very glad to hear from you at this time, Colonel Herbert.

STATEMENT OF MAYOR NORRIS POULSON, CITY OF LOS ANGELES, CALIF., READ BY COL. GEORGE F. HERBERT, ADMINISTRATIVE ASSISTANT

Colonel HERBERT. Mr. Chairman, committee members, my name is Col. George F. Herbert. I am administrative assistant to Mayor Poulson who is ill and has asked me to come here and read a statement which he would have presented to your committee had he been able to do so.

Mayor Poulson's statement reads as follows: As mayor of the third largest city in this country with an official population of almost 2½ million and a metropolitan area of almost 6 million people, I have been requested by your chairman, Hon. L. H. Fountain, to present a statement to your committee on the need for an accelerated Federal Air pollution control program in the local area.

Those of us who have served the public in the Los Angeles metropolitan area over the past decade are most conscious of the complex problem in air pollution which has also become the principal concern of our residents. As a Representative in the Congress of the United States from Los Angeles for five terms prior to 1954, and since then as the chief executive of this city, and as a director and currently the president of the League of California Cities, composed of 335 cities throughout California, I have maintained an active interest in the

control of air pollution and have contributed all within my power to assist in an effective solution.

California law, under provisions of the Air Pollution Control Act of 1947, has established the control of air pollution in county government. However, it has been the policy of the city of Los Angeles and other cities in this basin to provide complete cooperation in the elimination of every source of air pollution that might possibly contribute to our smog problem.

As mayor of the city of Los Angeles, I have been responsible for establishing what I consider to be one of the most effective rubbish collection and disposal systems operated by any municipality. The other 59 cities within Los Angeles County have also completed an outstanding job in substituting an effective rubbish collection and disposal system for the outmoded practice of open burning and the use of backyard incinerators.

As municipal officials, we have demanded and obtained the enforcement of air pollution control rules and regulations by the air pollution control district. In cooperation, we have provided the facilities of our city prosecutors' offices and have received the support of the municipal courts in our enforcement activity. It is important to note, and this can be confirmed by the officials of the air pollution control district, that convictions have been obtained in 96 percent of the air-pollution cases filed in our courts.

Insofar as rubbish disposal is concerned, public officials in the Los Angeles Basin feel that our streets and private properties are now cleaner than they ever have been in the history of the area. While our air-pollution problem has been relieved to a minor degree by our no-burning program, I cannot say that we have achieved an acceptable solution.

In some population centers, such as Pittsburgh and St. Louis, air-pollution control has been attained by regulating the burning of soft coal. I wish our air-pollution problem were that simple. We do not use coal of any variety in this area and yet our air pollution persists. In fact, smoke of any kind is difficult to find anywhere in the Los Angeles area. Ours, as you probably already know, is a complex air pollution which, in addition to reducing visibility, causes eye irritation and damage to agrcultural crops. It is this same type of air pollution which has reached alarming proportions in other areas and it is in the elimination of this pollution that we need Federal cooperation and assistance.

As mayor of the city of Los Angeles, I recommend that the United States Government proceed to initiate, as quickly as possible, a program including the following provisions:

1. Establish or designate a governmental agency at the Federal level to work directly with the automotive industry in the development of adequate controls over exhaust gases.

2. Establish a Federal air-pollution control agency and laboratory in the Los Angeles Basin. Such agency would correspond to a similar Federal agency for water-pollution control established in Cincinnati some time ago to study and control the purity of waters in the Ohio River Valley.

3. Effective participation by the Federal Government, perhaps through the United States Department of Agriculture, in determining the cause and effect of damage to vegetation by air pollution.

4. Develop public-health standards to determine the harmful levels of various air contaminants.

5. Establish advanced research facilities for the effective control of poisonous types of air contaminants.

6. Assignment to the Los Angeles Basin of qualified technicians instructed to report to the various Federal agencies the extremely serious nature of the various types of air pollution encountered in this area.

The adoption of any or all of the above recommendations by the Federal Government will contribute to the ultimate solution of our air-pollution problem and at the same time develop methods and procedures for solving similar air-pollution problems in other metropolitan areas.

That is the end of the mayor's statement, sir.

Mr. FOUNTAIN. Colonel, are you in a position to answer questions which the committee may want to ask, or would you prefer to leave that to the others who will follow?

Colonel HERBERT. In view of the fact, sir, I am here only as a reader of the mayor's statement, I would prefer to leave that to the witnesses that are to follow, although I am thoroughly familiar with the subject as Supervisor Dorn will tell you, because he and I have been working on it for a long time.

Mr. FOUNTAIN. Thank you very much.

Then we will be glad to hear from you, Mr. Dorn, at this time.

STATEMENT OF WARREN M. DORN, SUPERVISOR, FIFTH DISTRICT, LOS ANGELES COUNTY BOARD OF SUPERVISORS

Mr. DORN. Chairman Fountain, members of the Intergovernmental Relations Subcommittee, I am very pleased, of course, to join with Mayor Poulson and all of the elective officials of this community in welcoming you here.

I can recall early this past year our great concern over the lack of participation in this national problem by the Federal Government.

I can recall also my last appearance before a congressional committee, which was in 1953, before Chairman Reed's Ways and Means Committee.

I think it might be interesting to you gentlemen to know that at that time I was speaking on behalf of the League of California Cities, and representing them as well as the county division of that league, and I described our area as a county of nearly 4½ million people, composed of 45 cities.

Since that time, in 1953, I would have to report to you that we now have over 5½ million people in this county, and we have 60 cities within the boundaries of this county. I think this points up the tremendous influx of people from all over the country coming to this particular area. Naturally, along with this migration or influx of population, we received many problems.

I am certain that one of the problems aggravated and complicated by the influx of people here, is this very important problem of air pollution. Our latest figure is that there are 594 people—new people—coming to this country every day of every week of every month of every year.

So this just gives you an idea of the complexities of our government in trying to cope with this tremendous, almost explosive growth that we are experiencing here.

I am, of course, very pleased that you have come here. We, in January and February of this year, were in communication with the California delegation, and we, as they, were concerned over the lack of participation by the Federal Government in this great problem.

I am particularly pleased that Congressman Holifield, who comes from our county, has been a very interested member of your committee in this particular problem. I am pleased in discussing informally this problem with Mrs. Dwyer, that she has been a leader in this important problem in her area of New Jersey, which I think points up again the fact that this is a problem that affects people of metropolitan areas throughout our country.

I have, as I told you, and counsel, a prepared statement that I will file with your committee. I will speak briefly from this prepared statement, if it is your pleasure.

The air pollution problem confronting nearly all of the metropolitan areas throughout the United States is now recognized by both public leaders and scientists as one of national concern.

The county of Los Angeles, which has pioneered in the Nation in air pollution control action, under the California Air Pollution Control Act of 1947, has, for the past 10 years, been developing a strict enforcement program designed to eliminate, as far as possible, the various sources of pollutants within the jurisdiction of Los Angeles County.

We, of course, feel that the primary purpose that we have in this tremendous problem is to control all sources of emissions at their source and in furtherance of this program, millions of dollars have been expended, both by the county and by private industry, in compliance with the strict rules and regulations adopted by the county under the rulemaking power authorized by the State act.

Los Angeles County is now conducting what we believe to be the strictest enforcement program in operation in any local area or jurisdiction in the entire world.

There are three major sources of pollutants still remaining to be controlled, first, the operation of steam electric generating stations by public and private agencies.

Second, the refining, marketing, and use of petroleum products in automobiles. Third, miscellaneous industrial sources wherein scientists and engineers have not yet perfected adequate control equipment.

We have recently established an air-to-ground control enforcement unit consisting of light aircraft equipped with radio transmitters so that aerial surveys may be conducted, and enforcement messages transmitted to over 100 radio-equipped patrol cars.

This, of course, is a program that no other area, no other jurisdiction has ever attempted to put into operation, and we know here again the county of Los Angeles is leading the field in an attempt to eliminate all sources of pollution at their very source.

We have experienced outstanding cooperation from the nearly 6 million people residing within the county who are fully cooperating in enforcing the prohibition against rubbish incineration, effective on October 1, 1957.

Special credit must go to the people and to the 60 incorporated cities within the county of Los Angeles. Because of this splendid cooperation, and with the affirmative action taken by the California Legislature at its last session, and because of the additional rules and regulations as adopted by this board during this past year, we have been able to establish a crash program aimed at controlling emissions of pollutants at their various sources within the county.

I think I would like to emphasize the fact that the people themselves, and all of the people within this basin that we live in, are doing a tremendous service at great sacrifice to themselves in attempting to control the emissions of pollutants in this area.

We had originally planned, or a prior administration had planned, a ban on all industrial incineration for October 1 also. I am very pleased that the board of supervisors acted early in this year to move up that ban from October 1 to July 1, as it affects industrial incinerators. This step indicates the kind of money that is being spent and the kind of cooperation that is being received both from the people and from industrial developments in this area.

Despite all of the progress that has been made, there is yet much to be done locally, and the remaining steps which we are taking could be applicable to other cities or metropolitan areas in the Nation which are harassed as we are by a serious air-pollution condition.

We would respectfully suggest that there be an attempt on the part of the Federal Government to recognize this tremendous problem. The reason I say that is because these remaining sources that I referred to you as our major sources remaining to be controlled are not just sources that we have here.

There are automobiles emitting pollutants all over the country in every city and in every large metropolitan area of the country.

There are powerplant installations and facilities not just here in this county, or in this area, but they are needed, of course, in every metropolitan area of the country. Now, it doesn't seem reasonable or practical to me to think that we, here in this county, representing about 6 percent of the market for new automobiles, could be as effective in the enforcement and the bringing about of proper controls on automobiles as if we had the complete coordinated and cooperative program throughout the entire country on this problem.

I think that you will agree with me, and I will submit to you gentlemen, and Mrs. Dwyer, that these problems of which I am speaking are not just our problem. These are problems that are duplicated throughout the country.

The important thing that I think your committee should do—I think what we are all concerned with is that there be no duplication of these efforts by any level of government.

It seems to me the work that is being done here in this county, and has been done here for 10 years, should not be duplicated by some new program in some area of the country.

I would respectfully request that the Public Health Service, and, yes, the director of the Taft Research Center in Cincinnati, be requested to come here to Los Angeles to view with us our laboratory facilities and our plans for additional laboratory facilities, to see if there is a duplication of effort, or a duplication of spending of moneys by the Federal Government and by the county.

I think that this is something that we all must insist upon, that there be a consolidation of these programs and these studies and the research, rather than an individual separate study being carried on in various parts of this large country.

Mr. HOLIFIELD. Mr. Chairman.

Mr. FOUNTAIN. Mr. Holifield.

Mr. HOLIFIELD. May I ask a question of Mr. Dorn?

Mr. FOUNTAIN. Go right ahead.

Mr. HOLIFIELD. Mr. Dorn, from your knowledge of this program, both the Federal part of it and the California part of it, would you say that we here in the State of California have a greater research and development program than the Federal Government has?

Mr. DORN. Yes, this is my opinion; yes.

Mr. HOLIFIELD. Was your research and development program initiated and originated here, without scrutiny of the Federal program, or did your people check on the Federal program first to see how far advanced they were?

Mr. DORN. If you will recall, Mr. Holifield, this money that we are talking about here at this meeting was appropriated in the 1955 session of Congress. I can recall so very well appearing in prior years in Congress talking, of course, to Carl Hinshaw who used to represent a large portion of this area, and who sponsored part of this, or cosponsored part of this legislation.

What we are talking about is the bill that was passed wherein there could be not to exceed $5 million a year each year for 5 years.

Now, of course, I would submit to you that we here in the county had established a control program, and had adopted and planned for research as early as 1947.

Mr. HOLIFIELD. That is right.

Mr. DORN. It seems only sensible to me, and practical to me, that rather than to begin new studies, or do similar research in some other part of the country, that your people at the Federal level could come to this area and could take advantage of what we have to offer here, and study our findings and our facts, and then, perhaps, we would hope, reaffirm our belief.

We think this would be good and would be economical.

Mr. HOLIFIELD. Well, maybe I should have posed my question in the other direction. Has the director of the Federal research program studied thoroughly the Los Angeles program?

Mr. DORN. I think the activity of your congressional delegation, and our great concern here last January, has brought about a very accelerated interest on the part of the Public Health Service and those agencies at the Federal level that are interested in this program.

Mr. HOLIFIELD. I certainly agree with you, there should be no duplication of expenditures, both from the standpoint of the waste of time and the waste of money.

Are you satisfied with the Federal scrutiny of our program here, and do you, of your own knowledge, know of any duplicating research work that they are doing in the Federal program which has already been done here?

Mr. DORN. I can never be satisfied. It isn't my purpose to be satisfied. I am pleased in the interest shown by yourselves, and by Members of Congress, that I have talked to during this past year.

I think when we have only $40,000, which is all we have in the way of participation from the Federal Government, that this indicates, in itself, a lack of interest by the Federal Government.

It is my understanding that we have 2 administrators or staff people here from the Federal Government at an estimated cost to the Government of $40,000 a year.

Now I would submit to you——

Mr. HOLIFIELD. Is that in terms of salaries paid them, or does it also include expenses of research work that they are doing?

Mr. DORN. My understanding is, this is their salaries here, and what they are doing here is merely studying what we are doing and trying to coordinate what we are doing with what they intend to do.

Mr. HOLIFIELD. In other words, they are here as students rather than as teachers?

Mr. DORN. Well, I would rather you say that than I.

Mr. HOLIFIELD. I did say it.

Mr. DORN. This is the reason that we——

Mr. HOLIFIELD. In looking at your statement here, I noticed that you speak of the sum of $40,000.

Mr. DORN. Yes.

Mr. HOLIFIELD. Are you telling the committee that this is all of the money that has been available in the Los Angeles area from the Federal appropriation?

Mr. DORN. No, no, this is all that is available to the county of Los Angeles. There have been contributions made to private sources, such as doctors interested in certain aspects of this program. These people have received grants from the Public Health Service to make investigations and research.

Mr. HOLIFIELD. Those people are doing research to find out the effects of pollutants on the human body, are they?

Mr. DORN. Yes.

Mr. HOLIFIELD. They are not doing any basic research to develop mechanical devices or other methods of eliminating the pollutants at their source?

Mr. DORN. To my knowledge, the grants that have been made here are to doctors, and they are primarily concerned with the effects of air pollution and air pollutants on the health of the people.

Mr. HOLIFIELD. Looking at it from a practical standpoint, where do you think the money should be spent? I think it is pretty well admitted by everyone that pollutants are not healthy for the people—they are deleterious in their effect.

What would you advise in the expenditure of Federal moneys. Would you advise further research to find out the effect of air pollution on the human body or would you advise the Federal Government to go into the more practical area, it seems to me, of research and development of devices to prevent the dispersal of pollutants in the first place?

Mr. DORN. To answer that question, I would like to point up what we are doing here in this county. Our budget this last year is $4 million, which is a little more, I think, than the Federal air-pollution budget. This seems a little incongruous to me.

Our money is being spent to control the sources of pollution at their source. We have what we think to be the most effective, the

strictest, the most stringent enforcement program of any place in the world. Most of our money is being spent toward those ends.

Mr. HOLIFIELD. Your money is being spent on the enforcement, but it is not being spent in the research and development, of cleaning machinery for smokestacks and exhaust pipes, and so forth, is it?

Mr. DORN. Yes; we will spend approximately this year, approximately $1¼ million on research of various types.

I want to tell you gentlemen that I have invited Dr. Chambers here, who is the director of the research division. I have also invited Capt. Louis Fuller, who is the director of the enforcement division of our control district, and Mr. Chass, who is here from the engineering division. I would think you would want to ask those staff people, those technicians, these questions more than myself, even though I am very happy to answer them as best I can.

Mr. HOLIFIELD. In a general way, that gives us an idea of the program.

I suppose we might assume that the enforcement regulations which you are enforcing have also caused the industries to do a certain amount of research work themselves in order to comply with your standards.

Mr. DORN. Yes.

We think—well, also, I should have mentioned that here also is Dr. Arie Haagen-Smit, who is internationally known as an outstanding biochemist. I am certain he would like to speak to this subject, also.

We have invited Dr. Middleton to be here, and we have invited Dr. Pottenger to be here, and I think those gentlemen have some very technical information they would want to divulge to you.

I think as far as my part in this is concerned, it is to explain to you what we are doing here, and point up to you that we have what we think to be the strictest enforcement program of any place in the world.

We have years of experience behind us, and we know of the problems that are yet to be solved, but we know that these problems are not just ours. These are the problems of everyone throughout this country, and we know that, when we work together on this problem, we are going to be successful. We know also that if we remain apart and separate throughout this country, that we here with only 6 percent of the influence and the buying power of interest to the automobile industry of this country, we are not adequate to cope with such a large interest.

We shall be vigilant, and we shall make a very strong program of protest, and, of course, cooperation, too, but it would be much better, I think, and could be carried out much more effectively and efficiently by a national recognition of the program and a participation nationally.

Mr. HOLIFIELD. Certainly this area would give the Federal people a test-tube area, you might say, which is not excelled anywhere in the United States, because of our peculiar atmospheric conditions and the widespread growth of our industry.

Mr. DORN. Well, we all know the pollutants that we are trying to control. They recognize no geographical or political boundaries. They are just up in the air, and they are created by ourselves throughout this country, and I think it is the responsibility and the duty of

all of us, particularly those of us who are elected officials, to work together on this program, and the most efficient and effective way to do it is without duplication of efforts, moneys, or programs, and also a coordination and a cooperative program carried on by all of the levels of Government, the Federal, State, and local.

I would be very happy to answer any questions

I could read further from this prepared statement. I have given a copy to all the members of the press, and I shall file a copy with you, whatever is your pleasure, Mr. Chairman.

Mr. FOUNTAIN. Your statement will, of course, become a part of the record.

(The statement follows:)

STATEMENT BY WARREN DORN, SUPERVISOR, FIFTH DISTRICT, COUNTY OF LOS ANGELES

PARTICIPATING AGENCIES

There are at present primarily two separate levels of government concerned with air-pollution research and control in this area: the Federal Government, through the Department of Health, Education, and Welfare, and the Los Angeles County Air Pollution Control District.

ESTIMATES OF 1957–58 FUNDS EXPENDED

Estimates available here indicate that the expenditures at these two levels of government for air-pollution control work during the 1957–58 fiscal year will be approximately as follows:

Los Angeles County	$4,000,000
Federal Government	4,000,000

It can readily be seen that Los Angeles County is carrying much more than its fair share of the expenditures necessary to combat the ever-increasing air-pollution problem. The air-pollution problem is increasingly becoming of nationwide concern, and the Los Angeles County Air Pollution Control District is now, and has in the past, assumed the major portion of the burden to identify contaminants and research the control methods necessary before final eradication of this nationwide problem can be achieved.

FUNDS EXPENDED TO DATE

Since 1947, expenditures for air-pollution control have been as follows:

Los Angeles County	$10,000,000
Federal Government	8,500,000
Industries (for installation of control devices)	50,000,000

In addition, the recent enactment of rule 58 banning the single-chamber incinerator has resulted in the discarding by citizens of Los Angeles County some 1,500,000 incinerators, resulting in a monetary loss to the citizens of the county of approximately $48 million. Also, refuse-collection services necessary to dispose of the combustible refuse are costing the citizens of the county in excess of $20 million annually.

DELINEATION OF RESPONSIBILITY

The Los Angeles County Air Pollution Control District has been most concerned with the proper delineation of responsibility between the Federal Government and Los Angeles County to assure that the functions necessary to the final eradication of air pollution as a local and nationwide problem are properly and expeditiously consummated.

To accomplish this end, several conferences regarding research activities have been held. These conferences have been attended by members of the Taft Sanitary Engineering Center (Public Health Service), the California State department of public health, local air-pollution control districts in California, educational institutions, and local private research organizations. The primary ob-

jective at these conferences has been to arrive at a delineation of responsibility as understood by the Federal, State, and local agencies.

Largely through the efforts of Los Angeles County, the Federal agency in the United States Department of Health, Education, and Welfare was created to assist local jurisdictions in the solution of this all-important air-pollution problem. As a result of the above-described conferences, we now feel that the Federal Government has begun to assume some responsibility in this important field, and the air-pollution control district is looking forward to an improved, expanded Federal program.

EXPECTED FUNDS RECEIVED FROM FEDERAL GOVERNMENT

To date, the Los Angeles County Air Pollution Control District has received no grant-in-aid assistance from the Federal Government. Other than grants-in-aid, however, we have this year requested, and have some assurance of receiving, approximately $44,000 for 2 demonstration research projects and the assignment of Federal personnel to assist on specific research problems conducted at the Los Angeles County APCD facilities. Current direct assignment of Federal personnel is valued at approximately $40,000.

In addition, the Federal Government has agreed to support the Los Angeles County Air Pollution Control District's program in the following ways:

1. To take an active lead in stimulating (*a*) the development of methods and procedures employed in the analysis of automobile exhausts, (*b*) uniformity of procedures utilized in testing of devices designed for the internal-combustion engine, and (*c*) uniformity in definition of such concepts as operating cycle, driving pattern, etc.

2. Continuation of the assignment of two engineers to the district for participation in a survey of solvent and organic vapor sources.

3. Assignment of a specialist in industrial combustion to assist Dr. A. J. Haagen-Smit.

4. Provide consultation by industrial hygiene engineers and other specialists with respect to special problems involving organic vapor control.

5. Assignment of a physical chemist to the district to participate in the investigations of the chemical and physical interactions during smog formations.

6. Continuation of the assignment of a physicist participating in the studies of aerosols associated with smog.

7. Assignment of a bacteriologist for the evaluation of a technique developed by Dr. Goetz for assessing smog toxicity levels through the use of bacterial cultures.

8. Assignments of a meterologist to the district to participate in the initial phases of a study of the influence of the vertical component of air mass movements on the course of air pollutants.

9. Assignment of an engineer to participate in the design, development, modification, and evaluation of automatic instruments for continuous measurement of specific air contaminants.

10. In addition, the Federal Government has indicated plans for new or expanded contract or grant support of certain other projects, including (*a*) an agreement between the Public Health Service and the Bureau of Mines for a considerable increase in investigations related to the analysis of automobile exhausts, especially in relation to the composition of engine fuels; (*b*) the same agreement provides for the initiation of studies related to the development of oxidative catalysts for exhaust hydrocarbons; (*c*) an agreement between the Public Health Service and the National Bureau of Standards for cooperative air pollution research and investigations related to the development of analytical techniques and instrumentation for detailed analysis of specific atmospheric pollutants—in addition, it has been indicated that several research grants and research contracts with non-Federal agencies are contemplated; and (*d*) an agreement between the Public Health Service and the National Bureau of Standards provides for continuation of investigations of reactions among atmospheric pollutants.

INTERGOVERNMENTAL RELATIONS PROBLEMS

Geographic dislocation of participating agencies

One of the primary problems of an intergovernmental nature is caused by the geographic dislocation of the two major agencies insofar as appropriated funds available are concerned; namely, the Federal Government and the Los Angeles County APCD.

It would seem logical that a Federal program designed to assist local communities should be located where the most severe problem exists. Present Federal research activities are concentrated at the Taft Sanitary Engineering Center in Cincinnati, Ohio. This site was basically used for research in water pollution. The Ohio River was the most important water pollution problem in the United States at the time of the establishment of the engineering center. Cincinnati is far removed from the area having, currently, the more complicated air pollution problem and from the area where most of the experience and technical information on air pollution research and control has been secured. We would suggest, therefore, that research functions presently quartered in Cincinnati be located in the Los Angeles area. In this way the Federal Government would have available approximately 8 years of research data, most of which is of more than local interest. Also available is the most modern air pollution measuring and sampling network yet constructed. The Federal Government would have a close working relationship with the trained and experienced research personnel employed by the Los Angeles County APCD. This, combined with the Los Angeles County APCD's control experience, would produce the most economical results for effective use by local agencies throughout the United States, as well as by the higher governmental units.

Readjustment of Federal program to lend increased emphasis to contractural research

It is our opinion that the present Federal research program might well be readjusted to lend increased emphasis to contractual research which does not require use of Federal employees.

Under the present program, even though some change has been evidenced during the present year, insufficient use is made of the laboratory facilities or of trained personnel already employed in research agencies throughout the country. In order to meet the present objectives of the Federal air pollution program, it will be necessary for the Federal agencies to recruit and train personnel at least equivalent in skill to those available at the local level. This recruitment effort may not only delay positive results from Federal research, but will also unnecessarily dilute among the several levels of government the presently meager supply of technicians and scientists skilled in air pollution matters. It is our opinion that the objectives of the Federal program could be met better by utilizing the skilled staffs already available in both public and private agencies on a contract basis.

Change in emphasis of Federal program from one of a passive nature to a positive nature

A change in emphasis of the Federal research program from one of investigating requests of local agencies and supplying assistance or research funds as necessary on an individual, hit-or-miss basis, to one of assuming leadership in the total program, in determining program needs, ascertaining the gaps in the total research program in assessing areas of necessary research, and taking the initiative in sponsoring such research—not waiting for requests from local jurisdictions—is necessary.

At the present time, local jurisdictions submit requests to the Federal air pollution agency and approval is dependent upon the indivdual merits of that particular project.

Participation in the automotive research program

At the present time, a need exists for a higher governmental jurisdiction to work directly with the automotive industry in the development of proper controls for the automobile, which has been determined by all leading experts in the field of air pollution control to be the prime contributor to the air pollution problem.

Local jurisdictions find themselves at a disadvantage in their dealings with the automotive industry, and lack the prestige or soverign power to insure an all-out effort by the industry in the solution of the automobile exhaust problem.

Participation in crop damage research

It is felt that the Federal Government, perhaps through the United States Department of Agriculture, could assist materially and take the leadership in research necessary to determine the causes and effects of damage to vegetation by air contaminants.

The APCD has done considerable research along this line, however, damage to vegetation is properly a nationwide problem and is costing the farmers of this Nation millions of dollars annually. Botanists, plant pathologists, chemists, and other plant specialists presently existing in the United States Department of Agriculture could undoubtedly, with the facilities existing in the Federal Government, more adequately cope with this problem than could any local jurisdiction.

Additional areas of Federal participation

There are some projects and activities which we reiterate are more properly a concern of the Federal Government than of any single local entity. Among them, we believe, are the following:

(*a*) The development of public health standards indicating the safe and hazardous concentration levels for a variety of air contaminants including solid, liquid, and gaseous contaminants.

(*b*) The development and standardization of automatic instruments suitable for determining the atmospheric concentrations of contaminants which affect the public health and welfare.

(*c*) The development and administration of a nationwide air sampling program.

(*d*) Applied engineering research and standardization in the field of air pollution control equipment.

(*e*) The administration of training programs and development of appropriate training materials for use at local levels in connection with air pollution research, control, and engineering activities.

(*f*) The further development of standard procedures and methods for determining the chemical composition of the contaminants captured either through air sampling or testing at given sources of air pollution.

(*g*) Continued research in the field of fuel composition.

EMERGING PROBLEMS

Air pollutants, by their very nature, respect no geographic or political boundaries, and it is anticipated that as other areas witness increased urbanization with its accompanying industrialization their problems will become as acute as those now evidenced in Lose Angeles County.

To cope with this situation, it may be necessary in the foreseeable future to establish an air-pollution-control program perhaps on a more or less regional basis encompassing various counties or other governmental jurisdictions. These areas can undoubtedly benefit materially through the research and development work that has been conducted by the Federal Government, State of California, and Los Angeles County APCD, as well as that performed by private individuals and agencies. However, a continual control program will need to be installed and conducted if the air-pollution problem in any geographic region is to be effectively curtailed. It is felt that intercounty or interdistrict cooperation would not be sufficient in itself to cope with the myriad of problems that will arise when urbanization has increased in adjacent areas.

CONTINUATION OF FEDERAL RESEARCH PROGRAM

Research at the Federal level must continue even after the major sources of pollution as evidenced in Los Angeles County have been identified and controlled.

It is felt that when the major air-pollution sources as existing in Los Angeles County have been properly identified and adequate controls have been developed, including that for the automobile, a continual enforcement program will be necessary. It is this portion of the smog problem that should rightfully be handled at the local level. Research, however, must continue, and this portion of the program could most effectively be handled by the Federal Government, as new contaminants will from time to time need to be identified in the areas presently served by an air-pollution control district, and in those areas not under the jurisdiction of an air-pollution control district where the problems are increasing need will exist for a competent authority above the local or regional level to develop standardization of procedures, techniques, and controls, and to maintain such standards.

Mr. FOUNTAIN. Does that complete your statement?

Mr. DORN. Yes.

Mr. LIPSCOMB. May I ask a question?

Mr. FOUNTAIN. Yes.

Mr. LIPSCOMB. Mr. Supervisor, in your presentation you suggest the coordinating of air-pollution facilities. Also, in Mayor Poulson's statement he suggested we establish a Federal air pollution control laboratory here in Los Angeles.

Does the county of Los Angeles now maintain a laboratory?

Mr. DORN. Yes, we do.

One of the things we would like while you are here is to have you inspect our facilities and the plans we have for expansion of the same. I think they would be interesting to you.

Mr. LIPSCOMB. Do you have any way of knowing, or comparing the Cincinnati laboratory with the one which you maintain here in Los Angeles?

Mr. DORN. No, but I am certain Dr. Chambers could.

The problem is, Mr. Congressman, they went to Cincinnati, because it was near the Ohio River, to study water pollution. That is good sense. I mean this, to me, was a very economical and a very prudent program, but there is no point in taking the air-pollution problem there, too. I mean, I think they should follow up on their previous action, and bring to this area, where we of course are the leaders in this field, with many years of research behind us, rather than to start all over again in some other area of the country and duplicate our program and carry on additional research. They should come here and we would be very happy to work out a contractual grants-in-aid program of some kind wherein our past research would be available to you, and we would like to have your people here.

We think that we could work together very nicely.

Mr. LIPSCOMB. Have you carried your thinking far enough to determine whether or not there could be joint use made of the facilities which are now available here, or would there have to be new facilities built by the Federal Government to house the research necessary?

Mr. DORN. Three years ago, in the budget, there was placed a sum of money for a new administration building and laboratories for the county of Los Angeles. This was removed from the budget for many reasons, but in this year's budget there are moneys there for plans for a new laboratory.

The reason for this is because we are leasing our present laboratory facilities from a private person. It costs us $18,000 a year to lease this facility. We think it would be more economical and a more prudent program for us to develop our own laboratories, which we are doing. And with those new laboratories, and with the use of the ones that we have now in the interim period, we could present, I am sure, the finest facilities of any place in the country.

Mr. LIPSCOMB. One other statement in your prepared text here that I think is very important, and I certainly agree with, where you suggest that they reevaluate the research projects and the grants-in-aid they are now making to make it more realistic.

I think that is one thing this committee should certainly look into, is to find out why we can't concentrate on finding out the cause instead of hit and miss around the country on projects that really have not the relation to the problem that we are trying to solve, not only here, but nationwide. It is a good suggestion you have made in your statement.

S——22—67:23

Thank you.

Mr. DORN. We feel this program very keenly. We are very much interested in it, as I am sure you are all aware.

Mr. HOLIFIELD. You would be willing, Mr. Dorn, to cooperate, then, in any way that was feasible and practical, with the Federal Government in a mutual attack upon this program?

Mr. DORN. We would urge such a cooperative program.

Mr. HOLIFIELD. I am sorry you didn't read your whole statement, and give us a chance to take it point by point, since we are not familiar with it. However, the committee will, of course, have access to it, and will study it along with the other statements that are made today.

It seems to me that the program that the Federal Government is undertaking is almost trivial in comparison to the amount that you are spending here in Los Angeles County.

I am amazed that it is only $40,000 as against your budget of $4 million.

Now, I recognize, of course, that the Public Health Service is doing work in other parts of the country, but from your personal knowledge, do you know of work they are doing in other places which might assist you in your work here, or has the Federal program yet reached the point where they are able to contribute anything in the way of assistance to you?

Mr. DORN. When you are speaking of research and work on the problem, I would confine my answer to those research programs that are aimed at the control of sources of pollution, and not the medical research, because this is completely out of my field.

Mr. HOLIFIELD. Will we have a witness today that can speak on that?

Mr. DORN. Yes, Dr. Pottenger will be here. He has been for years, as we have been, interested in this problem.

The two main things that we are interested in, as is the Federal Government, is the control of the use of petroleum products in automobiles.

Now, we think there are two possibilities, a reformed kind of fuel to be used in the automobile that would not emit the percentage of pollutants that the present form does, and/or a control device.

Now, these are two different—entirely different fields of control programs, and they are being carried out by the industry because we believe it is the industry's obligation to do this. And they are also being studied by ourselves and the Federal Government.

Mr. HOLIFIELD. How much research is being done by the petroleum industry to develop a gasoline that will not throw these pollutants into the air from the exhaust pipes? Can you tell this committee?

Mr. DORN. I think Dr. Chambers could answer this for you more accurately than I. I know they had at least espoused a policy of carrying on a research program in this direction.

Mr. HOLIFIELD. Of course, the purpose of their technology is producing high-octane gasoline. Their main objective is to get an efficient power-producing fuel there.

Also, I think we have to take into consideration the fact that in many areas of the Nation the pollutants are carried away by the natural winds and do not irritate the people.

Do you or do you not think that the pressure that is going to have to be brought to bear upon the manufacturers of these fuels is a pressure by regulation in local areas which will say to them that the type of fuel which they are now producing has to be changed because of the peculiar atmospheric conditions, and either impose upon them a change in fuel, or impose upon the automobile owner the purchase of a device, rather than to try to seek the solution on a national basis?

Dr. DORN. Let me speak for a moment, if I might, on this subject, because it is very important.

As far as I am personally concerned, and I am sure I am speaking for the members of this board of supervisors and the people of this county, controlling the air-pollution problem, and the controlling of the emissions of pollutants in this atmosphere, is a program that involves tremendously powerful interests, not only of a local nature but of a national nature.

It is our duty, and it is our dedicated purpose, to carry on the strictest kind of a program that we can without fear or favor to any person or interest. This we have done. We have backed up our program in the courts, when necessary. This we shall continue to do.

But what I am trying to say to you—and if there is nothing else that you gentlemen get out of this meeting—it is the urgency, the need of all of us attacking this problem from a national level, wherein we can bring about greater pressures and programs to control these tremendously powerful interests.

Mr. HOLIFIELD. I certainly agree with you on that, but being a practical man, I try to look at these things from the practical standpoint of congressional action.

If we have peculiar situations in 10 or 15 cities in the country and if they would involve the imposition upon all of the automobiles all over the Nation of a gadget which would cost, let us say, $25 or $50, I just fear that you wouldn't get the congressional action you were seeking. Consequently, as far as the imposition of certain types of protection from pollution is concerned, I think you are going to have to obtain it on the local level.

I am not saying that with the idea in mind of the Federal Government escaping any of its obligation; I am just speaking plainly on the subject. There are areas where the Federal Government can move, in research and in the assistance of the solution of problems, but I think that is about as far as the Federal Government will go. In the application of the research and development work, and the knowledge which is obtained through the expenditure of Federal funds, along with local funds, I think that you will be placing your hopes on a false basis if you expect the Federal Government to pass national legislation which would apply to the variable conditions in certain high smog areas.

Mr. DORN. I think, prior to my coming on this board of supervisors, that there had been efforts by individual members of this board, and the board as a whole, in cooperation with counsel and other officers of the county. There have been certain commitments made to the people of this area that have not been fulfilled by the automotive industry.

Mr. HOLIFIELD. That is important to know.

Mr. DORN. It is my purpose, and the board of supervisors has authorized my going to Detroit along with County Counsel Kennedy, to see what progress is being made toward the fulfillment of commitments that have been made in the past that have not been carried out.

Now, every year the board, and particularly one member of this board, is in contact with these same manufacturers in Detroit. I am speaking of one of my associates, Kenneth Hahn. He has been there. He writes to them every year, asking for progress reports on some of the commitments that have been made in the past.

As we view it, these commitments have not been fulfilled, and there will not be, in 1958, on the automobiles sold in this area, control devices that will control the emissions of pollutants from automobiles.

It is our purpose to see that there is a control device, because we have the authority by the law of the State of California, upon a finding of this board, to require that there be placed, upon automobiles sold in this area, certain control equipment.

Mr. HOLIFIELD. That is the point that I was making. Certainly pressure should be brought to bear upon the automobile industry, which has such a tremendous market in California for their product. They have tremendous responsibility to help solve this problem, but I think that pressure has to come to bear upon them from local regulatory bodies, such as your air-pollution district. Where the Federal Government can help in the picture, as I see it, is by helping to do the research and the development of the devices which will do the work that you want done.

Mr. DORN. That is exactly——

Mr. HOLIFIELD. Do you agree with me on that?

Mr. DORN. That is exactly what we want. But this is a twofold program.

Mr. HOLIFIELD. Yes.

Mr. DORN. Just the recognition of the problem, and the allocation of moneys to these research programs, by the Federal Government, gives impetus to the entire program nationwide.

Mr. HOLIFIELD. I agree with you, and I also agree that this is a problem that affects other areas other than Los Angeles, and therefore should be considered on that basis.

Mr. DORN. That is right.

Mr. HOLIFIELD. And the research and development that naturally comes about as a result of Federal expenditures here in this area or any other area of the country, would be available to the whole Nation, wherever they have the need for that information.

Mr. DORN. Yes.

And you can be assured that the five members of this elected board of supervisors, and/or their agents, will carry on the most strenuous kind of local persuasive power on these national concerns, which is what we have been doing, and we shall continue to do.

But, as I said before, by just the mere recognition of this problem, as a national problem, and by the expenditure of these funds toward these control devices, and these control programs, by your people, and particularly in cooperation with us and other local jurisdictions throughout the country, then we are in fact adopting and carrying out a true crash program, as we have discussed before.

Mrs. DWYER. Will the gentleman yield at this point?

Mr. HOLIFIELD. Yes.

Mrs. DWYER. What percentage of the air pollution in the Los Angeles County area is caused by automobile exhaust fumes? Has that been conclusively established?

Mr. DORN. The scientists agree this is the major remaining source of pollution.

I would yield to Dr. Chambers or Dr. Haagen-Smit, or one of our special consultants, whose knowledge of this I am sure would be more accurate than mine.

Mrs. DWYER. I asked that question only because it would bear very strongly on the influence on the automotive industry to do something about it. That point is well established?

Mr. DORN. Yes. It is this board's position, and it is the position of the air pollution control district of this county that this is the largest single remaining uncontrolled source of pollutants in our atmosphere.

Now, whether it is 80 percent or 72 percent, or some other figure, I would prefer having one of our scientists give you that figure. All I can tell you is that it is and each member of this board, and all of our agents, consider this to be the one remaining uncontrolled source that is most important to be controlled.

That is because we think it is not only our problem, because there are automobiles in every metropolitan area of the country, but one also of national concern; but because we who represent 6 percent of this market do not have the sufficient power and prestige to cope with a national concern of this size, I think you would understand why we believe this to be a reasonable approach to the problem.

Mrs. DWYER. Thank you.

Let me compliment Los Angeles County for their magnificent pioneering work they are doing in this field.

Thank you.

Mr. DORN. I am just 1 member of 5. I don't know whether you understand exactly how this program operates, but under the State law, the 5 elected supervisors of this country are automatically the 5 members of the air pollution control board, and we, the elected officials, also serve as the members of this control board of the air pollution control district. I am just a part of this, as 1 member of a 5-member board.

I think we can prove to you people today from our testimony that we are carrying out, and have pioneered the most outstanding program of any place in the world. That is the purpose, I think, of Mr. Holifield having come here. I know that is our purpose in having asked you to come here.

Mr. HOLIFIELD. Mr. Dorn, I know I can express the sentiment of all the members of the committee, and particularly Mr. Lipscomb and I, as Members of Congress from this area. All members of the congressional delegation, whether they are Republican or Democratic, are affected by smog, and we are all 100 percent behind accelerating this program and making it more efficient.

As your witnesses testify today, I am hoping that this committee will get guidance so that we can bring out a report which will be helpful.

Mr. DORN. You mean it isn't a respecter of party lines either?

Mr. HOLIFIELD. That is right.

Mr. DORN. No more than it is geographically or jurisdictionalwise.

Mr. HOLIFIELD. We are all equally interested. I know that some of our colleagues in the southern California delegation who are not here today would appreciate me saying they are just as much interested in it as Mr. Lipscomb and I.

Mr. DORN. I would like to ask the Chair's pleasure. Mr. Griswold, who is the director for the air pollution district for us, is in Washington at this time, meeting with Surgeon General Burney's national committee that he has set up. He is preparing the agenda that you have.

I note that neither Dr. Pottenger's name and one of my associates, Kenneth Hahn, is on it. Perhaps you would like to include them on your agenda. Dr. Pottenger, I understand, will be here later.

Mr. FOUNTAIN. We would be very glad to do that, Mr. Dorn.

If in the process of questioning there is some member of your group whom you would prefer to have answer a particular question, don't hesitate to direct the question to him, and wherever he may be, he can answer the question.

Mr. DORN. Fine.

Mr. FOUNTAIN. In my opening remarks, I stated that the authorizing legislation passed by Congress, authorized the expenditure of not more than $5 million annually for the fiscal years 1956 through 1960, to carry on direct activities of the Public Health Service relating to air pollution control, and then I gave approximate figures indicating what the appropriations had been for 1956 and 1957. The exact appropriations were $1,722,000 in fiscal 1956, and $2,740,000 in fiscal 1957.

Mr. Dorn, have you had occasion to read and study a letter, dated April 8, 1957, signed by Surgeon General Burney, to Representative Joe Holt?

Mr. DORN. I do not recall reading it. I can recall an exchange of ideas between Dr. Burney and members of this board, and also congressional delegation members from this county. Maybe Mr. Kennedy, our county counsel, can answer.

Mr. KENNEDY. Mr. Chairman and members of the committee, I had planned in my presentation to make specific reference to the Surgeon General's letter, and I think a later communication than the one you have directed to Supervisor John Anson Ford, the chairman of the Los Angeles County Board of Supervisors, contains certain commitments on the part of the Surgeon General. And I think by going to that it points up the core of the purpose of the committee in coming to Los Angeles. I will deal with that in my presentation.

Mr. DORN. Mr. Chairman, I wonder if I could also supplement the supplement that you made to your initial statement about the $5 million a year for 5 years.

Mr. FOUNTAIN. Go right ahead.

Mr. DORN. You can imagine the shock that was felt by the elected representatives of people of this State of California, both Senators Knowland and Kuchel, and I certainly know Mr. Holifield was shocked, and I know Cecil King, who was instrumental in bringing about this legislation, all of those local and State and Federal officials from this State, who were the ones who pioneered for this source of

Federal participation, you can imagine our shock when we find that after this has been adopted by the Congress, we wind up in this participation to the extent of $40,000.

I think it wasn't quite as we had planned. It was our thought—I am sure you would speak for this, too, Congressman Holifield—but I am certain it was initiated in this State by our people. It was adopted and accepted by the Congress of the United States, but then when the allocations are made, we were surprised and shocked to see what we thought might be a duplication of what we had already done here. We want the participation to come here at this level, where we have what we think to be a tremendous headstart in this field.

Mr. HOLIFIELD. This subcommittee has the right to inquire into the efficiency of these expenditures.

Mr. DORN. Yes.

Mr. HOLIFIELD. We are glad to have the way this program is being handled brought to our attention.

Mr. FOUNTAIN. That prompts me to ask a question relative to particular portions of the letter from Dr. Burney to Congressman Holt on which I would like to have your comment.

In his letter, Dr. Burney says:

> Contrary to public statements, the Public Health Service has channeled a considerable portion of its resources directly to Los Angeles and to California. Actually, 14 percent of the research funds thus far appropriated have been used in California. This is far more than has gone to any other State. Some $500,000 has been expended in the State, including more than $200,000 in the Los Angeles area. Of our limited scientific staff trained in this specialty, more have been assigned to Los Angeles than to any other area. In addition, we have four officers on detail to the California Health Department for statewide work on air pollution.

That letter, of course, was dated April 8, 1957.

Do you care to comment upon that statement?

Mr. DORN. I think that is what Mr. Kennedy is going to refer to in his statement. He has asked for that privilege, and I would yield to him on that matter. I think my opinion is very clear on this subject.

Mr. FOUNTAIN. I will reserve such questions as I have relative to this letter until Mr. Kennedy testifies.

Mrs. Dwyer?

Mrs. DWYER. Mr. Dorn, perhaps you may want to pass these questions along to someone else, but I will start asking you, anyway.

How large a petroleum industry do you have in the Los Angeles area?

Mr. DORN. How large is the petroleum industry?

Mrs. DWYER. Yes.

Mr. DORN. I think here again it would be more accurate to have this answered by either Chass or Fuller or Chambers, any one of those staff people.

Mrs. DWYER. My next question would be, then, how much have they polluted the air by their plants and of the $50 million spent by industry, how much have they spent?

Mr. FOUNTAIN. Will you identify yourself for the record and then make your statement?

STATEMENT OF ROBERT L. CHASS, DIRECTOR OF ENGINEERING, AIR POLLUTION CONTROL DISTRICT, COUNTY OF LOS ANGELES

Mr. CHASS. My name is Robert L. Chass. I am director of engineering for the district's pollution district.

Mr. Chairman, and members of the committee, I believe your present question ties in with your previous question of what percent do we attribute to the automobile.

Technically, it is impossible to assign a percentage. That is compared to a situation of candy, apples, and oranges. We prefer to cite the statistics on a contaminant basis.

The one contaminant that is of prime importance in our situation are hydrocarbons or organic materials. The automobile, based on research up to date, contributes approximately 1,200 tons per day. The refineries, which total approximately, I believe, 19 in number, contribute approximately 105 tons.

The newest problem facing us, of our getting salts, thinners, in such operations as spraying, dipping, contribute about 400 tons. So with that one contaminant, you can see the portion attributed to the automobile.

As far as your specific question, the amount of money the refineries have spent, both in installation of petroleum equipment and in conducting research, I am trusting my memory now, I would say it is probably in excess of $6 million.

Mrs. DWYER. Thank you, sir.

I asked that question because we have Standard Oil of New Jersey in my own town of Elizabeth.

Mr. FOUNTAIN. Mr. Naughton, our staff counsel, I believe has a question or two.

Mr. NAUGHTON. Mr. Dorn, I wonder if we could get a little more of a breakdown with respect to the expenditures for research and for enforcement of air-pollution controls by Los Angeles County and the Federal Government respectively?

You have stated that funds expended by Los Angeles County since 1947 total $10 million.

Could you approximate for us how much of the $10 million was expended on enforcement activities?

Mr. DORN. There again, that is the reason we have Mr. Fuller here, to answer those questions for you. I would yield to Mr. Fuller.

Mr. FOUNTAIN. I think it would be helpful if all of you gentlemen who will testify could be in this immediate area when a question is asked, then we would be very glad to have the appropriate person respond to the question.

Mr. DORN. They are all going to participate, together with Mr. Kennedy, and Dr. Middleton also is here to testify.

Mr. FOUNTAIN. Thank you.

Mr. NAUGHTON. I will leave that subject until we can get those witnesses. I have 1 or 2 questions I think are within your own area.

At the time that the Federal Air Pollution Research Act was passed in 1955, was the Federal laboratory in Cincinnati expanded?

Mr. DORN. At the time of the enactment of the appropriation?

Mr. NAUGHTON. Yes; or shortly thereafter.

Mr. DORN. This, I don't know.

Mr. Chambers is prepared to answer that.

Mr. CHAMBERS. I think I might contribute to that, due to the fact at the time I was director of research at the engineering center in Cincinnati.

Mr. FOUNTAIN. Will you identify yourself for the record?

STATEMENT OF DR. LESLIE A. CHAMBERS, DIRECTOR OF RESEARCH, AIR POLLUTION CONTROL DISTRICT, COUNTY OF LOS ANGELES

Mr. CHAMBERS. Dr. Leslie A. Chambers, director of research, air pollution control district.

To repeat, at the time of the enactment of the legislation you are questioning, I was director of research of the Robert A. Taft Sanitary Engineering Center in Cincinnati.

The question, as I understand, is whether the center was expanded as a result of the appropriations; is that correct?

Mr. FOUNTAIN. Yes.

Mr. CHAMBERS. The answer to that is the facilities at Cincinnati, as they existed at that time, had been constructed under water pollution control legislation. The facility was one additional floor, the top floor, which had not been furnished.

The only change that was made, as far as I am aware, in the facility, was the equipment of that additional space with appropriate office furniture and laboratories, laboratory equipment, for limited amount of direct research.

There has been no increase in available building facilities that I am aware of.

Mr. NAUGHTON. This question might properly be directed to either Supervisor Dorn or Dr. Chambers.

At the time that additional Federal funds became available for expanded research, did Los Angeles County make an effort to have a substantial portion of those funds expended out here, rather than in Cincinnati?

Mr. DORN. I think I should answer that question by saying that I have only been a member of the board of supervisors since last December, having been elected last November.

The things you are talking about are the things which were a part of this program before I became a part of it, and therefore again I would want to yield that either to Mr. Hahn or to Mr. Kennedy, or some member of the staff who was present at that time.

All I know is that, immediately upon our becoming involved with the members of this board in this problem, we have initiated studies in comparable situations with the Federal Government, trying to, as I say, bring about a situation wherein there is no duplication between what is being set up by the Federal Government and what we have here to offer.

Mr. KENNEDY. Congressman Fountain, I wonder if I might make this suggestion?

Mr. FOUNTAIN. Yes.

Mr. KENNEDY. Having in mind it is 11:30, and we want to take the full advantage of the presence of the committee here today, and cover

the entire field as outlined in Mr. Naughton's letter to us, I suggest that, briefly, I lay a foundation, and then the members from the research staff who have been gathered here, I am sure have crystal-clear answers to the key questions that you Congressmen are vitally interested in.

I think the sooner that we get to a roundtable situation, where you throw out the questions, and the person most qualified to answer volunteers the answer, you will get the kind of record that you would like.

Mr. FOUNTAIN. That is the reason I suggested you all assemble around, because we may forget our questions if we wait until other witnesses come up. Consequently, we would like to have them answered by the appropriate person.

Mr. DORN. Might I also ask the Chair's pleasure? Is it your intention to be here all day today?

Mr. FOUNTAIN. Yes.

Mr. DORN. But you can not be here tomorrow, as was originally thought?

Mr. FOUNTAIN. Yes.

Mr. DORN. As I understand it, the original intent was to be here on Friday, but you have finished earlier than you anticipated in the north, and you are here for today?

Mr. FOUNTAIN. I think if it is necessary, we might be able to continue for a short time tomorrow morning. We are hopeful that we can finish up today.

Mr. DORN. The reason I ask is my office is endeavoring to contact other people that might be here if you are going to be here all afternoon, and who might come in in the afternoon session to take part in the hearings.

Mr. FOUNTAIN. We will be here all afternoon.

Mr. FISHER. I represent the California Clean Air League. I have no public official capacity, but I was wondering if I could present the public standpoint on this matter if we are going to organize a roundtable affair? It might be we would be excluded. I was wondering if I could be given a chance to talk at some time?

Mr. FOUNTAIN. We would be delighted to discuss that with you at the noon recess.

Mr. FISHER. Thank you.

Mr. FOUNTAIN. The committee will stand in recess for about 3 minutes.

(Recess taken.)

Mr. FOUNTAIN. The committee will come to order.

I understand Supervisor Hahn will soon have to leave, and for that reason the committee will be glad to hear from him at this time.

STATEMENT OF KENNETH HAHN, SUPERVISOR, SECOND DISTRICT, LOS ANGELES COUNTY BOARD OF SUPERVISORS

Mr. HAHN. Thank you.

Mr. Chairman and members of this committee, first of all, I certainly am sorry to not know you were coming down to Los Angeles. I didn't know about it until a little after 10 o'clock this morning, when I received a telephone call, saying this committee was in the board room.

My office is right across this hall there, and so it was quite a surprise to me to know that, and I am very sorry that the other members of the board, who were not notified by the air pollution control district, were not notified that you were coming down, so we could have a full board here with you. I apologize that the entire board is not sitting here, as I know they would all be here if they had been notified that you were coming here.

I feel very keenly about that, because to have a congressional committee—to my knowledge, it is the first time a duly authorized committee of Congress has ever used the board room, or ever had absolutely come to Los Angeles County for this exact purpose, holding hearings in this building.

They have had a few hearings in the Federal building on the overall picture of the State and the Nation on this problem, but never before were we honored with your presence in this room.

I am extremely pleased you are here.

I have been a supervisor for almost 5 years, this coming December.

The biggest problem this county has to face is air pollution, of a health nature. We have problems of roads, traffic, playgrounds, buildings, and hospitals, but it affects the 2 million or 5 million people—the county health is affected by the air-pollution problem which stands up No. 1.

Mr. HOLIFIELD. Mr. Hahn, may I just say on behalf of the committee's staff, that Mayor Poulson was notified and as I understand it, copies of our letter were referred to Supervisor Dorn and the air pollution control office.

I see our letter is under date of October 23, so it may be that the time was so short that the letter was not available to you for inspection. But I think the staff did——

Mr. HAHN. I wasn't criticizing this committee. I was trying to criticize some of our own staff for not notifying us.

Mr. FOUNTAIN. We made tentative arrangements to be here on October 10. I think it was within the last couple of days we decided to begin today rather than tomorrow.

Mr. HAHN. I am trying to say, Chet, our staff didn't notify us, rather than any criticism of this committee.

Mr. FOUNTAIN. Go ahead, Mr. Hahn.

Mr. HAHN. First of all, I think that the No. 1 problem that is yet to be solved, that where Congress is helping us—and that is what you are interested in, how can the Congress help the people of this country solve this air pollution—I think here is how, in my estimation, after all this research, all the work has been done, we have got the rubbish, we have all industries under control, except primarily two industries are not under control—only two left remaining, the petroleum industry, in its vast farflung operations, the cracking of gas, the refineries, the production, the grade of gas, and the content of the gasoline is the No. 1.

The automobile, the motor vehicle, the bus, the truck, and the passenger car, is the No. 2 solution yet to be discovered or the results to be eliminated.

Two industries yet have to be solved before we clear the air.

Now, on November 30 of 1954, I introduced a resolution to this board which was unanimously adopted, which was a resolution direct-

ing a copy to each Member of Congress, the Senate and the House of Representatives, and to the President, and to the Vice President of the United States, asking four things that Congress could do:

(1) Step up research on the problem of the air pollution coming from the automobile exhausts, and production of a satisfactory control device;

(2) Research on contributions of the petroleum industries to air pollution, and an investigation as to possible changes in the chemical content of gasoline which would reduce greatly or eliminate the source of pollution;

(3) Research on the health effects of air pollution on the human being;

(4) Support proposed legislation which would enable business to more speedily amortize special expenses due to the installation of small controlling equipment.

One was a tax structure, the power of Congress; the other three were research factors, something that this county could not do or has not been able to solve.

Now, it might be necessary—I have correspondence, which I will make available to your counsel and to this committee, starting back in 1952.

My first request to the county counsel for an opinion was whether the board of supervisors could legally stop the sale of any automobile in this county unless it was equipped with a device that was approved by the air pollution control district?

His opinion, which he will later on tell you about, came back affirmatively, we would have the power to do it if a device was available and was not discriminatory.

Second. I have correspondence here, my letters to the presidents of every automobile manufacturer, Ford, Chrysler, General Motors, Packard, and the rest of them, back in 1953: "What are you doing on the automobile?"

I have their answers. Every year I write to them. Every year we get answers. My earlier letter of 1953 indicated there would soon be a device ready. In 1958 there still is not a device. It might be necessary for the Congress, under the powers of Congress, under interstate commerce regulations, if the automobile industry does not assume their responsibility a little bit more seriously—they are doing tremendous research; they are spending $3 million a year, but yet there is no device yet developed. It might be the power of Congress through interstate commerce, to somewhat step in and help them be motivated to get a device for their automobiles.

I think the Congress can really put pressure on the industry for this research. We have done the best we can, but we can't tell General Motors or Chrysler, back in Detroit, in another State, outside of the jurisdiction of this county, how to manufacture an automobile, or a device.

I think this whole field of the process of cracking gas, the type of crude used, whether we can add something or take something away from the gasoline that would stop the air pollution, should be more thoroughly investigated.

This petroleum industry and the automobile industry are the two big ones.

The third resolution is the research on the health effects of air pollution on the human being. I am for that. But, gentlemen, and Mrs. Dwyer, of New Jersey, if we could solve the sources of smog, and stop the sources, the research on the health of the people would be secondary. Although we are spending money from the Federal—the Surgeon General has a research on health—it has been pretty well proved by the local medical authorities it is dangerous to health; we do get cancer. I have been in medical meetings where they said definitely the ratio of lung cancer in this county to other counties is much greater.

They have those facts, and I think the medical doctors should be asked to appear before you and give some of that testimony.

Dr. Paul Kotin, of USC, has done tremendous research.

The Los Angeles Medical Society have facts on this. But it is quite alarming.

I am for health research, but if we can stop it at the source, I think it would even be better.

The fourth point was the taxing situation.

Well, by now, as members of the Los Angeles area know, Mr. Holifield and Mr. Lipscomb, our industries already have got devices on all the steel plants, the lumber plants, the paint factories, the iron industry, the Gray Iron Foundation, all the rest of them are now under control. So the only two industries which are still left are petroleum and the automobile.

That tax structure has kind of faded out, because they have already had to go and put the devices on, anyway.

Mr. LIPSCOMB. There is some criticism of that accelerated tax amortization, also.

Mr. HAHN. I realize that.

At the time, in 1954, when we asked for it, there were a lot of industries going into expansion. Now the steel industries have their equipment already on——

Mr. HOLIFIELD. Are the gasoline cracking plants using control devices or not?

Mr. HAHN. Mr. Holifield, from the best information I get, we had a timetable for them to put certain devices for escaping vapor from their storage tanks, certain regulations on their valves, the leakage in their ponds, their gasoline ponds, and certain of the cracking processes, and they are under all those regulations. We have a total of 56 rules, which include most of these industries. We haven't got to the point of the effect of the content of the gasoline, the crude oil, or a synthetic process of cracking, or the type of gasoline—we haven't even done any rules on that yet.

But for the visible signs of their equipment, and their installations, there are rules, and there are certain steps that they have complied with. They have complied with all our rules, but there are still rules that we are not legally able to adopt because there is no research or facts known on it.

So I would say those two big problems the Congress could help us out on, and step up maybe some of this money going to the Surgeon General which should be going into the automobile research and the petroleum research, rather than on health research.

Those are briefly my statements. This is an enormous problem, because what affects Los Angeles affects America.

Truly, we are the defense center of not only the West but of America. We have a total output of our airplane production of 50 percent or better coming right from the southern California area.

Our tremendous research in electronics, and all the rest of the defense industries located here, are important to Congress and important to the country.

If we ever got a smog alert to the place it was getting back in October 1954, when we could have potentially a terrible disaster among our citizens—in effect, it is vital to the security of our country to have healthy citizens and all our industries working and putting out their production. It is not dramatizing it at all to say that during those 14 or 15 days when we were on a severe smog alert here in Los Angeles—in October 3 years ago, was it, Mr. Kennedy?

Mr. KENNEDY. Yes.

Mr. HAHN. At this time, it went to October 14, that every day the situation was almost near a panic here. They went into almost a third alert, which would mobilize and stop any industry from operating, stopping all automobiles. Even the Governor of the State flew down with a commander of the National Guard and chief of the highway patrol, to mobilize the State's personnel, in case we had to shut down the plants and to stop all traffic in this county. It was absolutely 14 straight days of severe air pollution.

Luckily, the air current came, and broke it on a Saturday. But even the refineries were notified by the Governor in a telegram to prepare for ceasing operations. That would take them several days to shut down the complete plant. The Governor sent each major refinery in this area, in October of that year, a telegram, urging them to prepare to shut down until the smog broke.

Some of you members in Los Angeles will remember those seriously. We haven't had anything that bad since 1954, but the potential still exists with this automobile. Because, as we cure one point, we get so many more automobiles in this county that the good that we are accomplishing is lost by the new motor-vehicle traffic.

Briefly, those are my remarks, and my request to the committee to pass on to Congress would be on those two major industries, automobile and petroleum.

Mr. FOUNTAIN. Thank you very much, Mr. Hahn.

Mr. Dorn?

Mr. DORN. Mr. Hahn has brought out a very good point here that I would like to get further clarification on as to the Chair's pleasure.

When I had the privilege of talking to your counsel last evening, we realized that this was a very short-notice situation, and we realized it was complicated by the fact that Mr. Griswold wasn't even going to be here, himself, so we spoke to the possibility of leaving this as an open record, wherein additional testimony might be presented at a future time.

I am wondering if this is going to be a rule of the Chair, that we should proceed?

I just learned from my secretary they are having difficulty in contacting Dr. Pottenger, whom we would like very much to have here.

Because of the time situation involved, could we understand that this will be an open record?

You are going to have another hearing 3 months from now, and could we, between this time and some set date, supply you with other testimony from public officials as well as the public, themselves, and particularly those we tried to get here today that couldn't be here?

Mr. FOUNTAIN. That was the plan of the chairman and the committee.

Mr. DORN. Thank you.

Mr. FOUNTAIN. Our time here is unfortunately limited. Naturally, we expect to get as much information from as many people as possible within that limited time.

We would like to hear from all who want to testify, but if we can eliminate duplication of testimony, and get more summarization, it would be very helpful.

If there is no objection on the part of the committee, it is the plan of the chairman to receive statements from persons who could not be heard because of limitations of time, so that this testimony will be available for study and for inclusion in the record, where appropriate.

Mr. DORN. Thank you.

Mrs. BARKELEW. May I speak for a moment?

Mr. FOUNTAIN. Yes.

Mrs. BARKELEW. My name is Mrs. Harry Barkelew. I wish to back up Supervisor Hahn in his statements of the attempts with the automobile industry to get cooperation. He has been there; Mr. Griswold has been there; Supervisor Dorn is expecting to go. They promised in 1958 to put on devices. In 1955, there was a device for trucks and buses, and it was approved, and Mr. Clayton, our manufacturer, has said that he wants another approval, so that has been promised us since July. That is 4 months.

Our lawyer called the air pollution control district, and they said it wouldn't take months, it wouldn't take weeks, it would take days. We waited 4 months, and we still haven't the final approval.

The law is in effect. This device can be used on trucks and buses.

Our manufacturer says he has other devices. He will bring them forth for testing when this one has been approved finally. He has told us that he has worked on the automobile device, and that he has designated, too, one of the industry, where they can put it on the 1958 model.

It is a possibility there is a device, and I do believe that the Congressmen and you people can be of help to our supervisors in this plight.

Thank you.

Mr. FOUNTAIN. Would the lady identify herself?

Mrs. BARKELEW. Pardon me?

Mr. FOUNTAIN. Would you identify yourself?

Mrs. BARKELEW. Mrs. Harry Barkelew.

Mr. FOUNTAIN. Thank you very much. Are you representing any particular group, or are you speaking just as a private citizen?

Mrs. BARKELEW. My husband is the patent holder of this device. It is an afterburning muffler.

Mr. FOUNTAIN. I see.

I might say to Supervisor Hahn, if he will submit to us a copy of the correspondence which he has had with the various companies, we will be glad to make that a part of the record, if there is no objection on the part of the committee.

Mr. HAHN. I will have that available for the committee this afternoon.

Mr. FOUNTAIN. Thank you.

(The material referred to appears in the appendix as exhibit E on p. 135.)

Mrs. Dwyer.

Mrs. DWYER. Thank you, Mr. Chairman.

Mr. Hahn, I was very much interested in what you had to say about the smog crisis of 1955.

What was the health hazard as it concerned the citizens of Los Angeles County at that time? Were there any deaths; were there any particular problems from a medical point of view?

Mr. HAHN. Mrs. Dwyer, I think the health of the entire community was affected.

Now, the county coroner, I believe, and the hospital people, said—this is just my memory, now—there were no deaths attributed to smog, as such, but there were deaths reported due to—I think there were just a few, but they didn't know whether it was from breathing or some other causes.

I am a layman, but I would imagine that it was a contributing factor to the health of the people, and certainly the hospitals, the county hospital patients complained, those who were suffering from bronchitis, or some other disease, that it was very difficult for them, and they were in pain and in discomfort during those smog alerts.

Mrs. DWYER. I imagine there will be some professional testimony as to the health hazards involved?

Mr. HAHN. I would also think—I am not sure; I don't think the county coroner has ever on any inquest ruled death due to air pollution; has he, Ed?

Mr. KENNEDY. To my knowledge, there has been no official finding by the coroner of this county that a death was directly caused by smog.

Mrs. DWYER. My second question, then, was on research, rather than control.

I wonder how it is going to be possible to convince industry that this is a health hazard to a community unless research definitely establishes that it is a hazard?

Mr. HAHN. I think the medical authorities will give you expert testimony under oath that it is a hazard to the health.

I think you will have ample testimony by the medical, that it is a hazard to their health.

Mrs. DWYER. It seems, then, research is very important to go on in conjunction with control, as such.

Mr. HAHN. I would like to make my point very clear. I am for research on health on human beings. Dr. Paul Kotin's study—he is working with lung cancer particularly—in regard to smog; I am for all of that. I would like to put the highest priority on the research of stopping smog, rather than putting such, the majority amount of money, from Congress, on the health.

Maybe we can have the proper committees of Congress see that proper funds are used by the Public Health Department, and the Surgeon General's Office, and maybe other departments, too.

Mr. DORN. Don't misunderstand me, Mrs. Dwyer.

The crisis Mr. Hahn referred to was not in 1955 but in 1954.

As he said, it was referred to as Black Thursday. I think it was the latter part of October of that year. I am sure the enforcement officer, and also Dr. Chambers, would want to testify as to the conditions as they exist presently, because we know that the atmospheric weather conditions of this area have a tremendous bearing on the pollutants that are held in this basin, and I think the records of this past year are very revealing as to the kind of effective efficient control program that is being carried out in the county.

Mr. FOUNTAIN. Mr. Hahn.

Mr. HAHN. Mr. Chairman, I would like you to correct in the record, if you care to, it was in October 1954, rather than in October 1955. We had those dates mixed.

Mr. FOUNTAIN. The record will show the correction.

Mr. HAHN. It was the only time, to my knowledge, and Mr. Kennedy, you correct me if I am wrong, we have 1 alert, 2 alert, and 3 alert stages. The third alert is the martial law, passed by the Governor in a disaster. We request the Governor take his powers as a governor during a disaster. It was the only time the board met after the second alert. We sat in this room here. The sheriff came over. All the proper county officials were in this room, ready to make the announcement as a disaster would exist in Los Angeles. That was how serious it was in October 1954.

Mr. KENNEDY. Mr. Chairman, for the continuity of your record, and while you are dealing with that very important subject, maybe this is the proper time to read into the record, make reference to the whole series of regulations adopted by the Board of Supervisors of Los Angeles County, in their capacities as members of the board of directors of the air pollution control district, on the 20th of June 1955.

The board of supervisors recognized that there was a limitation that a human being could absorb and still not die or become violently ill. And so for months prior to June of 1955, the board of supervisors asked Dr. Stafford Warren, head of the Medical School of the University of California, at Los Angeles, to head up a committee of 26 scientists, pathologists, specialists in the field of industrial medicine. They worked very diligently for several weeks, and reported to the board a comprehensive program that involved recommendations selected for specific pollutants.

They designated, as Supervisor Hahn has indicated, three stages of danger, a first alert, a second alert, and a third alert, and under the instructions of the board, the county counsel prepared regulation 7 to take care of the emergency steps that the district would take protective to the people, in the event that the concentration of any one of these four pollutants, carbon monoxide, nitrogen oxides, sulfur oxides, and ozone, reached—and I will hand to your counsel, for the record, a copy of the entire set of rules and regulations adopted by the air pollution control district, and make particular reference to regulation 7 for the emergency action program.

Therefore, the record should emphasize that this board of supervisors has addressed itself in order that there may not be in Los Angeles County a repetition of the Donora, Pa., tragedy, or the tragedy that took place in London in 1952.

Mr. FOUNTAIN. Thank you very much, Mr. Kennedy.

That material will be received, and the committee will later determine whether it is necessary to include it in the record. In any case, it will be considered along with all of the other testimony.

(Regulation 7 appears in the appendix as exhibit F on p. 145.)

Mr. FOUNTAIN. Mrs. Dwyer?

Mrs. DWYER. No more questions.

Mr. FOUNTAIN. Mr. Lipscomb?

Mr. LIPSCOMB. No questions.

Mr. FOUNTAIN. Mr. Holifield?

Mr. HOLIFIELD. No more.

Mr. FOUNTAIN. Mr. Naughton?

Mr. NAUGHTON. Mr. Hahn, are you familiar with the general approach that the United States Public Health Service is taking to the problem of air-pollution control?

Mr. HAHN. The answer would be just what I have been reading in the newspapers, that they are doing research by various grants to some of the universities and institutions, plus their own research at the Federal Center, the Taft Center, in Ohio.

Mr. NAUGHTON. I was going to ask whether you felt that the Public Health Service should expend a larger proportion of the moneys availab[illegible]or research on engineering research for prevention of smog, rather than on medical research as to the effects of smog upon the human body.

Mr. HAHN. I think it would be the wisdom of proper committees of Congress, or the Congress in their appropriations to the proper departments, if they would indicate to those departments that receive your appropriations, and that is the power of Congress to appropriate the money to them, your desire that they do a twofold program, one on health and one on engineering.

I think it would be much better, and the years of just research on health, then come up with the solution it is harmful, if they can give that report back to Congress, then your Congress will have to say, "Well, then, let's prevent it."

So if we could have a program by engineering and research on the devices to prevent this, would be wiser in my opinion than just on health.

Maybe the Congress can do it twofold. on health and research engineering.

Mr. NAUGHTON. I think the program calls for two types of research, one on the effects of smog upon health. and the other for research into the prevention of smog.

Mr. HAHN. I am not aware of any of the public health departments' work on devices or on the petroleum industry, as such.

Mr. NAUGHTON. They presently have authority for such work.

I take it, then, you feel they should spend more of the available money on engineering research than on health research?

Mr. HAHN. Could the counsel inform me if the Surgeon General's Office is doing research on devices, or on the petroleum industry?

I know of none.

Mr. NAUGHTON. I think there may be some research, but I don't know how extensive it is. Apparently it hasn't——

Mr. HAHN. It hasn't received widespread news if they are doing it.

Mr. LIPSCOMB. Mr. Chairman.

Mr. FOUNTAIN. Yes.

Mr. LIPSCOMB. I believe, if I may comment that what Mr. Hahn is suggesting is that this committee should try to redirect some of the emphasis that the Public Health Service and this whole program is making. I feel in my own mind that the emphasis right now is on the health aspect, and they should redirect more emphasis on the cause, not taking away from the health aspect. Over a period of years, as we have been talking here today, the whole allocation of appropriated money has not come into the field, and therefore they have not been able to do a complete and overall job. If we are not going to have the money to do both, we should put a little more emphasis on the causes of pollution and then go into the health aspects. We don't want to take away from health research, but we feel there should be more emphasis on the causes.

Mr. HAHN. I agree perfectly with your statement.

Mr. KENNEDY. Mr. Chairman, would you like to pinpoint the specific problem with reference to the responsibility of the United States Public Health Service in relationship to the Los Angeles County Air Pollution Control District?

Mr. FOUNTAIN. I think we would.

Mr. KENNEDY. It seems to me on the basis of the testimony this morning, the official position of the Air Pollution Control District of Los Angeles County is one of disappointment in the application of the Federal Government's $25 million program to date.

I think in fairness to the Surgeon General, specific reference should be made to his letter of July 23, 1957, addressed to Supervisor John Anson Ford, the chairman of the Los Angeles County Board of Supervisors.

In advance of this letter there were staff conferences held between the Surgeon General's department and the Los Angeles County Air Pollution Control District. They had frequent exchange of correspondence, and the district was indicating to the Surgeon General our concept of how we believed that money should be spent.

Many requests were made. The Surgeon General, in turn, asked for a specification of what the district would like, and as I understand it, the letter of July 23, 1957, incorporated a number of the specific requests made to the Surgeon General by the district.

For the purpose of the record, I will furnish to the counsel photo copies of the entire letter to obviate the necessity of reading it in its entirety.

I think I should read portions of it, and that would then set the stage for the committee to in turn direct questions to Mr. Chass and to Dr. Chambers, and have in your record exactly what the United States Public Health Service has done to date, and what it has promised to do, and then inquire whether or not if the Federal Government, through the Public Health Service, and the Surgeon General, follows through on these commitments, whether in the view of the

district that will be a satisfactory application of the program as far as the current year or next year is concerned.

Is that satisfactory?

Mr. FOUNTAIN. That is satisfactory, if there is no objection on the part of the committee.

(The letter is as follows:)

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE,
PUBLIC HEALTH SERVICE,
Washington, D. C., July 23, 1957.

Mr. JOHN ANSON FORD,
Chairman, County of Los Angeles Board of Supervisors,
Los Angeles, Calif.

(Through: Regional medical director, region IX, San Francisco, Calif.; and director of public health, California State Department of Public Health.)

DEAR MR. FORD: Thank you for your letter of July 3, 1957, in which you have summarized the actions and agreements reached during the meetings of our staffs during the week of May 20, 1957.

As you know, the President's budget for fiscal year 1958 included $4.1 million for air-pollution activities; the appropriation as passed by the Congress reduced this amount to $4 million. I am happy to advise you that within these available resources, the following actions have been or will be taken on items enumerated in your letter:

1. The Public Health Service will take an active lead in stimulating (*a*) the development of methods and procedures employed in the analysis of automobile exhausts; (*b*) uniformity of procedures utilized in the performance testing of devices designed to reduce or eliminate air pollution arising from internal combustion engines; and (*c*) uniformity in definition and specification of such concepts as operating cycle, driving patterns, etc. We shall be happy to arrange for Federal participation in your proposed research advisory council on automobile exhausts.

2. The two Public Health Service engineers presently on assignment to the Los Angeles County Air Pollution Control District, or their replacements, will continue on these assignments and will be available for participation in a survey of solvent and organic vapor sources in the Los Angeles Basin, and in a joint survey of evaporation losses arising from the production and storage of petroleum.

3. The interagency agreement between the Bureau of Mines and the Public Health Service for cooperative air pollution research activity during fiscal year 1958 provides for the assignment of a specialist in industrial combustion processes to assist Dr. A. J. Haagen-Smit in his study of control procedures applicable to large industrial powerplants.

4. The public Health Service will be pleased to provide for consultation by industrial hygiene engineers and other specialists with respect to special problems involving organic vapor control, at your request.

5. Provision has been made in the Public Health Service air pollution budget for a competent physical chemist for assignment to the district to participate in the investigations of chemical and physical interactions during smog formation. We shall appreciate the assistance of the district in the recruitment of this technician, with the understanding that the Public Health Service will employ him for assignment to the district.

6. The Public Health Service will continue Physicist H. J. R. Stevenson in his assignment to the district to participate in studies of aerosols associated with smog, collaborating with Dr. Alexander Goetz at the California Institute of Technology.

7. Details have been completed for the assignment of Bacteriologist Harold F. Clark from the sanitary engineering center to the district for the evaluation of a technique developed by Dr. Goetz for assessing smog toxicity levels through the use of bacterial cultures. Mr. Clark has already conferred with Dr. Goetz and the district staff, and arrangements are being made for laboratory facilities and other services in Los Angeles.

8. The interagency agreement between the United States Weather Bureau and the Public Health Service for cooperative air pollution activity during

fiscal year 1958 provides for the assignment of a meteorologist to the district to participate in the initial phases of a study of the influence of the vertical component of air mass movements on the course of air pollutants. Arrangements have also been made for the Weather Bureau to undertake the necessary negotiations to obtain professional services on a consulting or contract basis from the meteorology department of the University of California at Los Angeles, or another suitable source, for the planning and conduct of exploratory studies leading to an adequate investigation of the movements of polluted air masses in three dimensions over the Los Angeles Basin. In addition, these arrangements would provide for a review of the procedures used at Los Angeles for prediction of air pollution intensity, and advice concerning the minimum extent and types of data collection needed for reasonably satisfactory predictions.

9. Provision has been made in the Public Health Service air pollution budget for fiscal year 1958 for an engineer to be assigned to the district to participate in the design, development, modification, and evaluation of automatic instruments for continuous measurement of specific air pollutants. Here, again, we will appreciate the assistance of the district in recruiting an engineer for this purpose, with the understanding that he would be employed by the Public Health Service for assignment to the district.

We understand that the district will submit applications for the three demonstration grants noted in your letter. These applications will be considered, along with others received, by our advisory committee, and will be judged on their merit in competition for the limited funds available for such grants.

With regard to your request for Public Health Service plans for new or expanded contract or grant support of certain other projects, we wish to advise you of the following actions to date:

1. The agreement between the Public Health Service and the Bureau of Mines for fiscal year 1958 provides for a considerable increase in investigations related to the analysis of automobile exhausts, especially in relation to the composition of engine fuels.

2. The same agreement provides for the initiation of studies related to the development of oxidative catalysts for exhaust hydrocarbons.

3. The agreement between the Public Health Service and the National Bureau of Standards for cooperative air pollution research activity during fiscal year 1958 provides for the continuation of investigations related to the development of analytical techniques and instrumentation for detailed analysis of specific atmosphere pollutants. In addition, several research grants, and research contracts with non-Federal agencies, provide for investigations in this area; it is conceivable that applications for research grants in this area will be received during fiscal year 1958 and these applications will be considered by the appropriate review body.

4. The agreement between the Public Health Service and the National Bureau of Standards also provides for continuation of investigations of reactions among atmospheric pollutants. Several research grants will be continued which also pertain to this area of interest, and applications for additional grants will be considered.

Your kind offer to supply needed environmental data for use in studies related to the health effects of air pollution, and to provide data reduction and analysis and statistical services within the limitations of staff competence and equipment, are certainly appreciated. Our staff will include these services in formulating operational plans.

I would like to assure you that the opportunities which our air pollution staff has had to consult with the staff of the Los Angeles County Air Pollution Control District have been most helpful in providing direction and guidance for the national air pollution research and technical assistance efforts. We believe that these consultations and the expanded cooperative program being undertaken will promote even closer coordination between the Public Health Service, the California State Department of Public Health, and the district.

Sincerely yours,

L. E. BURNEY, *Surgeon General.*

July 26, 1957: Respectfully forwarded.

CHARLES F. BLANKENSHIP, M. D.,
Regional Medical Director.

Mr. KENNEDY. Having already offered the entire letter, in fairness to the Surgeon General, in the record, could I, Mr. Chairman, at this time, ask Mr. Robert Chass, the director of the engineering department of the air pollution control district, to address himself specifically to which of these items has the United States Public Health Service now accomplished?

Mr. LIPSCOMB. May I ask a question here?

Mr. FOUNTAIN. Mr. Lipscomb.

Mr. LIPSCOMB. Do we understand that the applications for grants have all been made; all the requirements that were put on the Los Angeles County, in this letter, have been followed through, as far as the county is concerned?

Mr. KENNEDY. Yes; that is my understanding, that we have fully complied with all of the requests of the Surgeon General, and have made detailed application for the specific grants.

Mr. HOLIFIELD. Have you recommended the specialist, as the Public Health Service requested?

Mr. KENNEDY. I think that, Mr. Holifield, can be answered by Mr. Chass.

Mr. HOLIFIELD. All right.

Mr. FOUNTAIN. Mr. Chass.

Mr. HOLIFIELD. Will you take those points one at a time, so that the committee may have them in order just as given, and give us a report as to what has happened?

Mr. CHASS. I would be happy to. As previous testimony indicated, there are major areas of concern, and the other areas as indicated in this letter are, perhaps, areas for supporting evidence.

Again, as stated before, the automobile, in our opinion, is the major uncontrolled source of air contaminants in Los Angeles County.

The No. 1 item in Dr. Burney's letter: To our knowledge, the Public Health Service has not yet taken an active lead in stimulating the work leading to a control device for the automobile.

Mr. HOLIFIELD. This commitment on their part was for fiscal 1958, which began last July.

Mr. CHASS. That is right.

Mr. CHAMBERS. I would like to modify that slightly. They have conducted a conference, held in Cincinnati some 4 weeks ago, in which industry representatives, Bureau of Standards, Bureau of Mines, other governmental agencies involved, the district, and the independent agencies were represented, the object apparently being to arrive at some basis for joint action to set up a plan of procedure.

It was unfortunately a meeting that led to very little in the way of concrete results, for the reason that the only thing that could be agreed to was there was insufficient factual information available to serve as the basis for the development of standards for performance for devices or gadgets or techniques applied to the automobile.

Just exactly where it will go from there, I don't know. It is obvious it is certainly needed in this area.

Mr. FOUNTAIN. Go ahead, Mr. Chass.

Mr. CHASS. I just returned yesterday from Cincinnati, spending 3 days at the Taft Center. In meeting with their personnel, it is my understanding that they intend to start probably around the first of the year in some kind of investigative work at the center, itself.

The exact nature of the project is still not definitely established So that again, going back to my answer, whether or not they had taken the active lead, I believe we in the district feel they haven't done what they should have done.

The No. 2 item, the two health service engineers, are still on assignment to the district, and they are participating in a joint survey of the refineries. This project is expected to be completed by the first of the year, and the personnel then join another team for work on the oil production.

I believe it is apparent that these personnel are a matter of our team, and they are not providing the leadership, they are merely participating. The district in this case is providing the leadership on the projects for work.

The No. 3 item, the interagency agreement between the Bureau of Mines, for research in regard to industrial combustion processes, a specialist has been assigned to this area, and is working with Dr. Haagen-Smit in his work on carbonites. I believe he is present and will testify or can testify in further detail on this item.

Mr. FOUNTAIN. Which Federal agency supplies that specialist, Mr. Chass?

Mr. CHASS. Do you know, Dr. Haagen-Smit, is he from the Bureau of Mines?

Dr. HAAGEN-SMIT. I haven't seen the man yet.

Mr. KENNEDY. Could I suggest, Mr. Chairman, I believe Dr. Haagen-Smit plans to make a more comprehensive statement, and I believe he would like to do that, so all of his statement and advice to the committee would be in the record in the same place. That is why he is not amplifying the question at the present time.

Mr. FOUNTAIN. That is all right.

Mr. HOLIFIELD. On this last statement though, Mr. Chass apparently is in error.

Mr. CHASS. I stand corrected.

Mr. HOLIFIELD. A man has not been assigned. There has been no action. All right, go ahead.

Mr. FOUNTAIN. As I understand it, these are commitments which have been made by the Federal Public Health Service.

Mr. CHASS. These commitments have been made as a result of a joint meeting between the United States Public Health Service personnel and district personnel here in Los Angeles.

Mr. FOUNTAIN. All right, go ahead.

Mr. CHAMBERS. I think in connection with this particular one it might be well to point out that the Surgeon General has stated that they have altered the interagency agreement between the Department of Health, Education, and Welfare, and the Bureau of Mines to provide for the assignment of this individual by the Bureau of Mines, so that we are dependent upon the selection by the Bureau of Mines, rather than by the Surgeon General.

Mr. FOUNTAIN. Let me get this straight. Were these commitments made in July of this year?

Mr. CHASS. They were made to my knowledge——

Mr. KENNEDY. I can answer that, sir.

Mr. FOUNTAIN. Mr. Kennedy.

Mr. KENNEDY. The commitments were made in a formal letter dated July 23, 1957, to Supervisor John Anson Ford, and personally signed by the Surgeon General, and were forwarded through channels through Charles F. Blankenship, M. D., regional medical director, on July 26, 1957.

Mr. CHASS. The meeting of the two staffs was held during the week of May 20, 1957.

Item No. 4, regarding the consultation services, regarding the possible control of organic vapor losses, one meeting has been held at which time representatives of the United States Public Health Service and the California State Department of Health and the district personnel were present.

No. 5: As far as the physical chemists for assignment to investigate the chemical and physical interactions, this assignment has not been made as yet, and to my knowledge the actual individual has not been appointed.

Mr. HOLIFIELD. Have there been any recommendations on that point?

Mr. CHAMBERS. There has been recruitment action. There are two individuals we have interviewed while in the East, either of whom would be acceptable. It is a matter of actually getting a contract.

Mr. HOLIFIELD. There has been no recommendation as yet?

Mr. CHAMBERS. Not yet, sir; not officially.

Mr. CHASS. No. 6: The Public Health Service will have H. J. R. Stevenson to work with Dr. Gess. This is going on.

No. 7, regarding the bacteriologist, Mr. Clark. Mr. Clark, I believe, arrived on the scene possibly 2 or 3 weeks ago; is that right?

Mr. CHAMBERS. That is correct; he is working actively on it.

Mr. CHASS. On No. 8, the interagency agreement, regarding the problem of the vertical component, the movement of air masses: The initial phases of this investigation are already completed, and plans are under way to contract, I believe, with a member of the University of California, Los Angeles staff, to head this organization.

Mr. HOLIFIELD. There has been no assignment of a meteorologist as yet. You are planning on contracting, you say, with the university to furnish the service?

Mr. CHASS. I believe the United States Public Health Service intends to contract with the UCLA.

Mr. CHAMBERS. The point again is it is the United States Weather Bureau that will make the contact.

Mr. HOLIFIELD. But there hasn't been a recommendation yet by your local group, is that right?

Mr. CHAMBERS. The local group in this case was not called upon to make the recommendations, sir.

Our recommendation was that the United States Weather Bureau take the responsibility for making the assignment, and for participating actively in the action related to the meterological aspects.

Mr. HOLIFIELD. You are satisfied then with the progress of your negotiations?

Mr. CHAMBERS. Not satisfied, but I think the reasons given for the failure to recruit and place the man, under the present circumstances, is the lack of availability of competent manpower. We have the same problems of recruitment ourselves.

Mr. FOUNTAIN. Mr. Chass.

Mr. CHASS. No. 9, regarding the assignment of an engineer to participate in the design, development, and modification and evaluation of automatic instruments for measurement of specific air contaminants. The engineer has not been employed, and again it is a matter of recruiting the best available person.

I believe this covers the nine questions Mr. Kennedy read from Dr. Burney's letter.

Mr. KENNEDY. Mr. Chairman.

Mr. FOUNTAIN. Mr. Kennedy.

Mr. KENNEDY. I think possibly by way of rebuttal on the part of the Surgeon General, if I do not call specific attention at your public meeting to the next 4 points, which I referred to summarily, he might feel that he was put in a false light by not having it announced at the same meeting of 4 additional offers which he made, not included in the 9 points as already read; and, with your permission, I would like to read those into the record.

Mr. FOUNTAIN. Go right ahead.

Mr. KENNEDY (reading):

With regard to your request for Public Health Service plans for new or expanded contract or grant support of certain other projects, we wish to advise you of the following actions to date.

(1) The agreement between the Public Health Service and the Bureau of Mines for fiscal year 1958 provides for a considerable increase in investigations related to the analysis of automobile exhausts, especially in relation to the composition of engine fuels.

(2) The same agreement provides for the initiation of studies related to the development of oxidative catalysts for exhaust hydrocarbons.

(3) The agreement between the Public Health Service and the National Bureau of Standards for cooperative air pollution research activity during fiscal year 1958 provides for the continuation of investigations related to the development of analytical techniques and instrumentation for detailed analysis of specific atmospheric pollutants.

In addition, several research grants and research contracts with non-Federal agencies provide for investigations in this area.

It is conceivable that applications for research grants in this area will be received during fiscal year 1958 and these applications will be considered by the appropriate review body.

(4) The agreement between the Public Health Service and the National Bureau of Standards also provides for continuation of investigations of reactions among atmospheric pollutants. Several research grants will be continued, which also pertain to this area of interest, and applications for additional grants will be considered.

Your kind offcer, i. e., to the district, to supply needed environmental data for use in studies related to the health effects of air pollution, and to provide data reduction analysis and statistical services, within the limitations of staff competence and equipment, are certainly appreciated. Our staff will include these services in formulating operational plans.

Mr. HOLIFIELD. It seems to me, after listening to Mr. Chass' report, that the Public Health Service is now moving along in a cooperative way. Am I right in reaching that conclusion?

Mr. KENNEDY. Congressman Holifield, I would answer that on the basis of the information that I have, that is, as attorney for the air pollution control district, from the statements made by Mr. Chass and Dr. Chambers this morning, that since July 23, 1957, the Surgeon General has moved forward in good faith to implement the commitments outlined in his letter to Supervisor Ford, and so my answer would be, in my judgment he should be given full faith and credit for

cooperating in the program, and if these commitments are carried out during fiscal year 1958, I think the United States Public Health Service should be credited with cooperation on the part of the district.

My only reservation would be that the whole program necessitates a reorientation. Possibly I am somewhat biased in my viewpoint, because I happen to have participated in the hearings that led to the adoption of the 1955 legislation.

We recognized that because air pollution, at the local level, is a local and/or a State problem, that we had the responsibility to adopt the rules and implement the program. We had no right to ask the Federal Government to engage in research that did not meet the standard of being also useful to all parts of the country.

Mr. HOLIFIELD. That is right.

Mr. KENNEDY. And in that category, in respect to the automobile exhaust, because of the great concentration of automobiles in this area, because the standards of gasoline are quite uniform throughout the country, we believed that because we had the finest network of air sampling of any place in the country, that it would be wise planning, administratively, for the Public Health Service to concentrate more of their activities here, not for us exclusively, but for every other metropolitan area in the country that is now or will be harassed, by the pollutants from automobiles.

Mr. HOLIFIELD. That seems to be a valid suggestion. Let me ask you at this point: Do you know of any other city in the United States that is making an effort to solve the problem of air pollution in terms of manpower and money expended equal to that of the Los Angeles area?

Mr. KENNEDY. My answer may seem a little self-serving in view of my position with the district, but I believe the record will show, based upon the 10 years' experience, that the Los Angeles district has had, and as this committee meets here today you happen to come on the month of the 10th anniversary of the activation of the district, and during that 10-year period we have spent more money than any other agency in the world on this problem, and to a greater degree, in my opinion, the records will show we have used our resources for self-help to a degree beyond what we might have been expected to do.

And so my answer is definitely in the affirmative to your question.

Mr. HOLIFIELD. That is important to this committee, because if there is going to be a concentration of the Federal activity, it should be in the area where the biggest effort and the biggest need exists.

If your testimony is sustained, as I am sure it will be, knowing you for many years, and knowing you do not make statements idly, it will give the congressional delegation from California and it will give this subcommittee, some strength in helping you to fight this problem.

Mr. KENNEDY. Thank you.

Could I add one additional statistic in the record? From the inception of the district, through the present fiscal year, there has been appropriated and/or spent more than $10 million by the county of Los Angeles, and during this period, through the adoption of these rules and regulations already referred to we have required industry, and industry should be given credit with the fine degree of cooperation to spend more than $50 million of their own money for control devices to be in compliance with our strict rules and regulations.

Mr. LIPSCOMB. Mr. Chairman.

Mr. FOUNTAIN. Mr. Lipscomb.

Mr. LIPSCOMB. I think there is one other thing we could say about the effort which has been done in Los Angeles County. It hasn't been a selfish effort, but it also has been of benefit nationwide, too, because we have recorded the information on the things we have done, haven't we?

Mr. KENNEDY. It has been the official position of the board of supervisors of this county that, because air pollution is of national concern, because the money that we have spent has been taxpayers' money out of one pocket, and then in a very generous way we should make available to any and all agencies, not only in California, but elsewhere, this data.

The records of the district will show that, from many points in the United States, directors, scientists, investigators have come to inquire as to what we have done, and have, in turn, been saved the expenditure of duplicating other public money, because the district made available to those areas such information as it desired.

Mr. HOLIFIELD. Mr. Chairman.

Mr. FOUNTAIN. Mr. Holifield.

Mr. HOLIFIELD. The staff has furnished me a partial list of the different cities having air-pollution-control programs, with the amount of manpower which they have assigned to this problem. These are the numbers of local personnel that they have assigned to the problem. I find that Los Angeles is credited with 272 people assigned to this. Is that approximately correct?

Mr. CHASS. No, sir; those figures are quite old.

Mr. HOLIFIELD. These figues may be old.

Mr. TITTERINGTON. It is 522.

Mr. HOLIFIELD. It is now 522?

Mr. TITTERINGTON. That is correct.

Mr. HOLIFIELD. My figures are a year old, the staff tells me. I think an attempt should be made, Mr. Chairman, to contact these different States and bring up to date the amount of people they have assigned to the air-pollution work in order that we might have the comparative statistics to use in our further work on this program.

As I look through this list here, I see, for instance, the State of Illinois has 27 people assigned, and, again, these may not be up to date. City programs in New York, I see, the largest cities, have about 25. And then in Pennsylvania, where we know they have a problem, Harrisburg, Allegheny County, Erie, Philadelphia, and Pittsburgh, have a total of about 40 or 50.

So, I think, in order to have our records complete on this important point, we might have the staff bring that up to date. I notice also that Cincinnati has 17 people assigned to the work in comparison to our 522.

Mr. CHAMBERS. The city of Cincinnati, not the Federal agency.

Mr. HOLIFIELD. Yes; I am talking about local personnel.

Akron, 3; Cleveland, 8; Columbus, 4; Dayton, 4; Toledo, 3; Youngstown, 2; and Zanesville, 1. So, the total there is not over 40 people assigned in the State of Ohio, as compared with 522 assigned in the Los Angeles area.

So, I think this substantially proves the contention that southern California, particularly Los Angeles County, is making an all-out

effort on this point, and certainly sustains the position that the Federal Government's effort should be closely coordinated with the effort here.

(The information referred to is as follows:)

The 1958 Directory of Governmental Air Pollution Agencies, published by the Air Pollution Control Association in cooperation with the United States Public Health Service, lists the following numbers of employees for some of the larger full-time local air pollution control programs:

California:	
Bureau of Air Sanitation and Air Sanitation Laboratory, Berkeley	28
Bay Area Air Pollution Control District, San Francisco	31
Santa Clara County Health Department, San Jose	16
Illinois: Department of Air Pollution Control, Chicago	61
Kentucky: Jefferson County Air Pollution Control District, Louisville	10
Michigan: Bureau of Smoke Inspection and Abatement, Detroit	23
Missouri: Division of Smoke Regulation, Department of Public Safety, St. Louis	14
New York: Department of Air Pollution Control, New York City	77
Ohio:	
Department of Urban Renewal and Housing, Cleveland	24
Department of Safety, Division of Smoke Regulation and Inspection, Columbus	11
Pennsylvania:	
Air Pollution Control Section, Division of Industrial Hygiene, Pennsylvania Department of Health, Harrisburg	13
Philadelphia City and County, Air Pollution Control Section, Division of Air Pollution Control and Environmental Sanitation, Department of Public Health	23
Division of Air Pollution Control, Department of Public Health, Pittsburgh	13
Tennessee: Bureau of Air Pollution Control and Boiler Inspection, Chattanooga	11
Texas: Stream and Air Pollution Control Section, Harris County Health Unit, Houston	14
Wisconsin: Milwaukee County, Department of Smoke Regulation	12

Mr. CHASS. May I add to Mr. Kennedy's comments? The air pollution district spends considerable time and manpower in assisting other areas with their problems. Unfortunately, this has become quite a burden on the district.

Mr. KENNEDY. But still, Mr. Chairman, it is the official position of the county of Los Angeles, although expensive and burdensome, that all of this data is available to any agency coming here to secure it. In any plans which the Federal Government may have for the future, the Federal Government can assume that this contribution will continue to be made in behalf of all other areas in the country.

Mr. FOUNTAIN. Gentlemen, it is time to adjoin for lunch.

We have operated somewhat at variance from our usual procedure this morning, because you are more familiar with this problem than we are, and because we think this roundtable approach enables you to put certain information in its proper perspective.

Now, Mr. Kennedy and Mr. Chass, do either of you care to make any additional or supplemental statements?

Mr. CHASS. I don't believe so.

Mr. KENNEDY. Yes, I have some additional information.

Mr. FOUNTAIN. Will you be able to come back this afternoon?

Mr. CHASS. Yes, sir.

Mr. FOUNTAIN. I wish you would come back, because we may have some questions to ask you, and that is also true of you, Dr. Chambers, and all the other witnesses whose names are on the agenda.

Mr. KENNEDY. Dr. Haagen-Smit is here and would like to testify, and Dr. Middleton is here. Dr. Pottenger is expected this afternoon.

Mr. FOUNTAIN. I have on the agenda here, Dr. Chambers, Mr. Fuller, Mr. Chass, of course, and Mr. Kennedy, and then we have Dr. John T. Middleton and Dr. R. J. Haagen-Smit, who are listed as attending as guests.

However, we would be very glad to hear from these gentlemen. Are there any others?

Mr. KENNEDY. There is a possibility Dr. Pottenger may be available. We haven't received definite confirmation. He has been the chairman of the Los Angeles County Medical Smog Committee, and has addressed himself to the effects of smog upon health.

Mr. FOUNTAIN. Thank you very much.

The committee stands recessed until 2:30.

(Whereupon, at 12:45 p. m., the subcommittee recessed.)

AFTERNOON SESSION

Mr. FOUNTAIN. The committee will come to order.

Mr. Chass, I believe you have some supplemental observations you want to make as a result of a question you were asked this morning.

Mr. CHASS. In answer to a question posed by Mrs. Dwyer, as to the amount of money spent by the petroleum industry, I would like to correct the record to read as follows:

Since 1947, the petroleum industry has spent approximately $6 million in research investigations, and more than $24 million in installation of petroleum equipment.

Mr. FOUNTAIN. Did you get that information from the petroleum industry?

Mr. CHASS. Through our system, we have a tabulation to our system of all the money spent for petroleum equipment in Los Angeles County.

Mr. FOUNTAIN. Mr. Kennedy?

Mr. KENNEDY. Yes.

Mr. FOUNTAIN. Mr. Kennedy, we will now hear from you and let you make any other observations you may care to make.

Mr. KENNEDY. All right, thank you.

I would like to advert to the important subject of the fact that we are told by the experts that the next most important source of air pollution yet uncontrolled is from the automobile.

Since the inception of the district, our experience has been, because controls are expensive to private industry, that unless and until sharp rules with teeth in them have been legally adopted by the district, that we have not made any real effective progress in a given field.

For example, at the outset, when we were dealing with the steel mills, the Bethlehem Steel Corp. had an open-hearth foundry near Huntington Park in an industrial aera, but close enough to population centers that it was causing distress to a large number of people, and it was necessary for us to get an injunction in the Federal court to restrain the operation of the steel mill before top management of the steel company agreed to a cooperative program that in turn led, on their part, to the abolition of the open-hearth furnaces, and the installation of electric precipitators that cost several hundreds of thousands of dollars.

We found it was necessary to apply that same pattern to lumber mills, to furniture manufacturers, to coffee mills, to the manufacturers of tires, roofing material, gray iron foundries.

When we come to the automobile situation, the pollution is caused not by the factory making the cars, most of which are in Michigan and in other States, but it is the product of the factory.

In 1953, in September, Supervisor Kenneth Hahn asked the county counsel to study the question, and on October 27, 1953, we prepared a formal opinion. I will read two paragraphs, and then file the balance of the opinion with your counsel to include such portions in your report, if any, that you desire.

On September 14, 1953, you requested our opinion as to whether the board of supervisors, sitting as the air pollution control board, after notice and hearing, expert testimony that automobile exhaust gases are a material contribution to the smog problem, could require every new automobile sold in this county for use here, including those sold in cities, to be equipped with a device which would eliminate or reduce exhaust gases, or set a time limit after which any new automobile, bus, or truck would be required to be equipped with such a device approved by the air pollution control district.

Our answer is that the rulemaking power of the board of supervisors, sitting as the air pollution control board, is broad enough to cover almost any conceivable situation in connection with the control of air pollution in this county. Such powers, however, may not be exercised arbitrarily, capriciously, or unreasonably. Board action must be based on proven facts, or sound scientific opinion. As the engineers and chemists discover new sources of or new remedies of air pollution, the board's power extends to these new sources and remedies. Answering your question more specifically, the board will have the power to require motor vehicles to be equipped with the device to eliminate the emission of air contaminants as soon as such a device is perfected, shown to be effective, available on the market, and the requirement of its use is found to be reasonable.

Now, obviously, it was not within the capacities, even with our tremendous resources of the air pollution district, to do all the scientific research, particularly in the automotive engineering field, that would either develop an afterburner in the form of a device to put upon the exhaust pipe, itself, or to improve the automobile engine, itself, from the standpoint of combustion and to reduce the amount of raw gasoline that is emitted when there is deceleration.

Therefore in a very real sense, it required a cooperative effort on the part of the automotive industry, and the district, to bring about a satisfactory result, and so as long ago as 4 years we started with diligence to secure cooperation from the automotive industry, and from the correspondence which Supervisor Hahn will furnish for your record, you will see the types of replies received from the automotive companies.

Having been affiliated with the district since the beginning, and recalling 4 years ago when the scientific team came out from the East under the leadership of a man from General Motors, Mr. John Campbell, who is assistant to the famous Dr. Kettering, in their research division of General Motors, we have contended that air pollution from automobiles was one of the principal sources. At the beginning, the automotive industry was not cooperative, they taking the position that an equal amount of pollutants was formed or made by the combustion of rubbish.

Now, happily, with the adoption of the October 1, 1957, ban against all types of backyard incineration, together with the July 1, 1957, ban

against the commercial rubbish incineration, we have at long last put to rest their contention that the incineration of rubbish was of equal concern and source, and the facts speak for themselves. We still have smog in the Los Angeles basin.

Mr. HOLIFIELD. Has the degree of intensity of the pollutants decreased?

Mr. KENNEDY. Yes, somewhat.

Mr. HOLIFIELD. How much has it decreased as a result of the incinerators?

Mr. KENNEDY. I will ask Dr. Chambers to answer that question.

Mr. CHAMBERS. I think, again, I am not qualified to answer that question, sir, because we have a variety of pollutants. All of them have decreased appreciably within the last 3 years. There has been a steady trend downward, in all active ingredients, all except one, namely, carbon monoxide, which increased slightly. That might have been expected because of the normal increase of consumption of gasoline in vehicles. But the percent of decrease has ranged upward to 50 percent, depending on which pollutant we happen to be talking about.

I think it is unsafe, however, at this stage, to say that the observed measured obvious decrease in the frequency of eye irritation and severe smog is entirely attributable to a real decrease in pollutants. One has to examine these data very carefully in the light of known meteorological cycles, which may be of 2 or 3 years' duration. We don't want to fall into the trap of saying we have done a job, when as a matter of fact, Mother Nature has done a good deal of it for us.

I am optimistic. I believe the trend is a real one. There are solid reasons to believe that is the case, but I think we have to keep our fingers crossed due to the uncertainty of meteorology.

Mr. KENNEDY. Taking into consideration the offers that have been made, some of which have been more cooperative than others, we feel that if out of the hearing of this congressional committee, together with your report, together with the United States Public Health Service putting in sharp focus the fact that to make progress in this field would be doing something for every metropolitan area in the country and not just alone for the Los Angeles area, that if it resulted in the balance of the approximately $20 million available to the Federal Government resulted in whipping this one last remaining one important source, that the money would have been quite well spent.

The problem is sufficiently serious to justify a review of that kind, and we feel that we have gone just about as far as we can in arresting the attention and interest of the automotive industry, and that we will need the prestige and the influence of the Congress and the Federal agencies to, if necessary, crowd the automotive industry to discharge their full responsibility in this important field.

The automotive industry is one of the largest industries in the country. They think nothing collectively of spending millions and millions of dollars in new tooling, and in our judgment, because one of the primary purposes of government is to protect people, it is not an unreasonable request to exact of them a very genuine effort and the expenditure of a large amount of money. If it is good public relations for them to pay Bob Hope $100,000 to emcee a General Motors annual kickoff of new models, it would seem from their standpoint it might

be good judgment to review good public relations to concentrate with all of the agencies of Government in trying to improve the air-pollution problem.

So we would like at this hearing to put that in its proper importance and in sharp focus in any report that might be coming from this committee.

Mr. HOLIFIELD. You are expecting, Mr. Kennedy, some kind of a development in the automotive world which will reduce the pollutants that are thrown into the air from the exhaust pipes. This is what you are really expecting and desiring, isn't it?

Mr. KENNEDY. Yes, we are hopeful the ingenuity of automotive engineering itself will improve the situation to reduce the pollutants and possibly save fuel for sustained or increased power.

Mr. HOLIFIELD. Have there been any satisfactory devices manufactured which have been tested by your air-pollution agency up to date?

Mr. KENNEDY. Yes, there have, and I will ask at this time that Mr. Chass will address himself to that question.

Mr. CHASS. I am sorry, Mr. Holifield; could you repeat your question?

Mr. HOLIFIELD. Yes, I would.

I would like to know if there has been brought to the attention of the air pollution district people any devices to attach to the exhausts of automobiles and buses which have shown an ability to eliminate these pollutants.

Mr. CHASS. During the past 4 years, our automotive laboratory has perhaps tested well in the neighborhood of 200 such devices. All except one have shown no promise. One had very limited application. It was a device which is known as the Clayton afterburner, which has been designed for the exhausts of buses, with a very narrow operating range.

Mr. HOLIFIELD. What do you mean by a narrow operating range?

Mr. CHASS. The sizes, I believe, between 550 and 700 cubic-inch displacement engines. When the device is tested on internal-combustion engines outside of that range, the efficiency falls off considerably, to the point where the device cannot be considered adequate.

Mr. HOLIFIELD. All right.

I assume now you are speaking of passenger-car test results.

Mr. CHASS. That is right.

Mr. HOLIFIELD. What is the efficiency in comparison with the efficiency on buses?

Mr. CHASS. The device can't even be applied to passenger automobiles, because of its design, and if for no other reason than the intense heat put out in the device itself. It was not designed for passenger cars, so that it is not even capable of being put onto a passenger automobile for testing. Even for testing on other trucks and buses of smaller size or larger size, it has not proved adequate.

To my knowledge, the same designers are still working, hoping to be able to adapt this one device for operation on a smaller vehicle.

Mr. HOLIFIELD. Did your board approve the Clayton device?

Mr. CHASS. The air pollution control district has issued a report showing the efficiency of its operation, and has approved the Clayton afterburner for this particular application.

Mr. HOLIFIELD. But not for other applications?

Mr. CHASS. Not for other applications.

Mr. HOLIFIELD. In other words, your position is, it will take more research and development to develop a device that can be applied to passenger automobiles generally?

Mr. CHASS. Yes, sir.

Mr. FOUNTAIN. Mr. Chass, what conclusions have been reached as to the extent of pollution by the petroleum industry in their refining processes?

Mr. CHASS. The refining industry in Los Angeles County is such that it emits into the atmosphere almost all types or all kinds of contaminants. The principal one, as far as the ingredient of smog formation is concerned, is hydrocarbons.

This morning I testified as to the amount of hydrocarbons being emitted from the entire industry in this area, of approximately 105 tons per day. There are approximately 19 refineries. Every refinery is operating today in compliance with the existing rules and regulations regarding fumes, sulfur dioxide, smoke, and hydrocarbons.

Mr. FOUNTAIN. Are your rules and regulations stiff enough with respect to the petroleum industry?

Mr. CHASS. They are the most stringent that we know how to write today. Should additional engineering investigations show that there are other areas for which control devices can be applied, we will be the first to recommend to the air pollution control board that they be enacted.

I should point out that the air pollution control district has in effect at all times a program for just such an evaluation for the purpose of assuring ourselves that the existing rules are the most stringent that this area demands.

Perhaps to give you an idea of just what the approximately $24 million of control equipment brought about in the refining industry, that before controls it was estimated that the industry emitted in excess of 800 tons per day of hydrocarbons, so that their improvement has been substantial.

Mr. FOUNTAIN. What about the content of the gas, itself. Have you been able to reach any conclusions as to whether anything could be done to the gas before its gets into the automobile, so that some of these control methods you suggest for automobiles might not be necessary?

Mr. CHASS. For approximately a year, the air pollution control district has been investigating the relative merits of different types of gasoline and their oxidizing capabilities. Perhaps we might hear from Dr. Chambers, since he is heading that particular research work.

Mr. FOUNTAIN. Good.

Were you through, Mr. Kennedy?

Mr. KENNEDY. Yes, at this time.

Mrs. BARKELEW. May I have one question here?

Mr. FOUNTAIN. I am sorry, Madam. We have to hear from a number of witnesses——

Mrs. BARKELEW. He is talking about a large bus muffler, put on a small automobile. You wouldn't test that yourself. You would not make one the same size.

Mr. FOUNTAIN. This committee is not here to determine what methods of control are best. We are simply here to determine whether the appropriate Federal agency is doing what ought to be done.

Mrs. BARKELEW. He is talking with his tongue in his cheek.

Mr. FOUNTAIN. Did you have a further suggestion, Mr. Kennedy?

Mr. KENNEDY. I was going to suggest Dr. Chambers pick up the question with respect to whether consideration has been given to the improvement of the gas, itself.

Mr. FOUNTAIN. That might be a good point for you to discuss at this time.

Mr. CHAMBERS. I assume I have been sufficiently identified.

In connection with the question about the possibility of substitution or change in fuel composition in order to effect a change in the smog resulting from emissions from the tailpipe, there are 2 or 3 facts that I might present first of all.

As early as 1951, Dr. Haagen-Smit, who was here this morning, demonstrated that some of the things the hydrocarbons, organic materials which come out of the tailpipe, are responsible for the basic reaction that results in either loss of visibility, or plant damage in this area.

Among other things, he showed certain organic compounds, namely, those which contain an unsaturated condition in the molecule, the olefins, which are much more reactive in this respect than are the saturated materials that are normally found in mineral oils and that type of thing.

Now, it became obvious to some of us that if this were indeed the case, and were uncomplicated by other factors, that it might be that our problem lay in the composition of the fuel that went into the automotive engine initially. If we could avoid the production of unsaturated materials of this sort in the tailpipe from the tailpipe, on emitting them in the first instance, from the fuel charging the engine, then we might have a more satisfactory approach from the standpoint of enforcement and regulation than that of putting on a mechanical device which would require inspection of 3 million vehicles and continual maintenance and an added cost to each purchaser.

Following that up, we examined a number of gasoline compositions, with respect to their so-called olefins, or unsaturated content, in parallel with their capabilities performing eye irritants, and, to summarize briefly, we have found that the amount of irritant formed from the exhaust produced by the various fuels is somewhat proportional to the amount of unsaturated material in the charging fuel that goes into the engine in the first place.

Now, the general idea has been opposed pretty vigorously by many persons, scientific and otherwise, on the grounds that it has been assumed that any fuel going into an engine is transformed, during the process of combustion, in such a way that it would be chemically unrecognizable as the charging fuel when it comes out of the tailpipe. Therefore, there is no hope of effecting any change by this means.

I think we have effectively demonstrated that at least under certain operating conditions, this view can no longer be held.

There is also, as you will suspect, a certain opposition to the development of a concept of this type for the reason I think that it implies the possibility of applying controls on an economically important processing operation, and any suggestion of limitation of freedom in compositing gasolines is obviously not tasteful to people who have got to make their money by making such compositions.

I am guessing; I am not an authority on this subject at all, but we have, I will say this—we have worked closely and effectively with the technical committee of the petroleum industry locally. They have provided us with fuels according to our own specifications, and have actively supported us in reviewing our work and seeing to it that we don't get off into technological bypaths, or traps, that they can keep us from by exercise of their own technical judgments. We appreciate this.

Mr. HOLIFIELD. Have they also used that advisory capacity to guide you into certain channels they wished you to take?

Mr. CHAMBERS. As I mentioned, in New York when this question came up a few days ago, we have accepted their advice and have used it where it was possible to do so judiciously.

Another facet of the situation that is of great interest to me right now stems from the fact that we have examined a number of fuels composited by the industry and by others and we have found, in general, what I have said to be true; that the irritants produced from the tailpipe somewhat is proportional to the olefin content of the fuel that goes in.

Of great interest is the fact that fuel composited according to specifications which were current in 1954, as contrasted with a fuel current in 1957, standard premium-brand fuels of this area, the fuel of 1955 shows a substantially higher capacity to produce irritants in our operating conditions than does that in 1957. The primary differences between those fuels that we have been able to put our fingers on so far is again the olefin concentration. The present-day fuel is down to 22 or 23 percent olefins, whereas, in 1955, it was on the order of 35 percent.

We have compared this with a fuel which represents a wished-for but not yet available fuel in this area, a so-called reformation fuel, which has no olefins, or less than 1 percent. And in this case the smog-producing potential is again drastically reduced.

Mr. HOLIFIELD. What about the economic factor involved there?

Mr. CHAMBERS. All I can say on that, sir, is this: I am told, because of the pressure of demand for higher and higher octane ratings in gasoline to meet the auto industry's demand for that kind of a fuel, there is and has been for the past 3 years an increasing tendency of the industry to process gasoline in such a way as to produce more saturated materials or aromatic materials, reformed fuel, and thereby reduce the amount of the unsaturated component in the fuel. This has come about as a result of the economic pressures.

At present, I am told that in 1954 approximately 10,000 barrels of this reformate-type fuel was produced daily in this area by the local industry. That is now, I believe, up to about 112,000 barrels per day, representing some 14 or 15 percent of the total throughput of petroleum in the refineries.

This is reflected in the additions to the premium-grade gasoline, and it is my present opinion—and I think we can support it with some evidence now—that the change produced by this economic pressure, in spite of the beliefs of persons to the contrary, has, as a matter of fact, produced part of the change in the smog situation that we are already experiencing in this area.

If this trend continues, I would predict that the gradual substitution of reformates of this sort, and elimination of the straight-run components of the fuel, will produce more and more effect as we go along.

I think the petroleum industry eventually will recognize it has unconsciously and inadvertently made a contribution of this sort.

Mr. FOUNTAIN. What, in your opinon, can the petroleum industry do now that it isn't doing to help alleviate this situation?

Mr. CHAMBERS. As in the case of the auto exhaust control device, mechanical device, it is my belief that no fully tailored fuel that will be consistent with the economics of the petroleum industry, as well as compatible with the requirements of the engine, could be produced or should be produced without thorough research and investigation by the petroleum industry.

I believe that the role of the district in this particular regard, and the role of the Federal Government, insofar as it can go in support of our activities, can only be in the direction of producing certain facts which may needle the industry or encourage them to investigate the thing, at least in their own defense, if not in a real spirit of attempting to solve the problem by this particular means.

Mr. FOUNTAIN. Do you feel that the present requirements which the petroleum industry must comply with are adequate?

Mr. CHAMBERS. Do you mean with respect to the operation of their refineries?

Mr. FOUNTAIN. Yes.

Mr. CHAMBERS. My opinion would be a complete duplicate of what you heard from Mr. Chass, I believe, on that score. That does not include the question of composition of fuel, or the processing that they engage in. I am referring now only to the losses through evaporation or combustion stacks or refinery stacks.

Mr. FOUNTAIN. Are there any questions of Dr. Chambers on this particular subject?

Mr. Kennedy.

Mr. KENNEDY. Could I suggest, Dr. Chambers, that you give the committee a clear idea as to the role of the district in the immediate future in making progress in connection with the automobile exhaust as to whether or not, in effect, the district has done all of the things it reasonably can until the automotive industry makes the next major move?

Mr. CHAMBERS. I am not sure I know how to answer that question. I think it is within the capability of the district to do a great many things under pressure, of necessity, that I think the district in all conscience should not be called upon to do, solely. That, I believe, is the case with the study of the fuel composition in relation to smog. This is a highly technical area in which the district has the capability of recruiting and staffing a laboratroy capable of doing a thoroughgoing job; yes. On the other hand, the Federal Government, the Bureau of Mines, in particular, and the petroleum industry, in effect, have a "corner" on the technological competence in the petroleum chemistry field. That, essentially, is what we are dealing with.

I think, wherever possible, if the competence that is already marshaled and exists in other areas can be brought to bear on this problem,

that is what should be done. If we find we can't get it done by such means, then, obviously, we have to do it.

We are planning to carry forward this investigation of fuels, in relation to exhaust or smog-forming potential, at least far enough to make it conclusively evident that some control can or cannot be effected by means of regulation of the petroleum that goes into the gas tank.

Mr. HOLIFIELD. Dr. Chambers, a local body, such as your county supervisors and your air-pollution district, formed under the laws of the State, has a very powerful police power. It also has a taxing power through the county supervisors.

If we are suffering here in Los Angeles with a peculiar air inversion situation which makes this type of pollutant a threat to the happiness and health of the people of this area, I would think that you would have ample authority to place upon the type of gasoline which produces these pollutants a special tax, equivalent at least to take care of your air-pollution expenses, and maybe more, particularly if this so-called reformed gas, if I got the word right from you, is available, and if it can be produced by refineries in an economic manner.

Mr. CHAMBERS. There is no question, I think of the legal authority to take necessary action.

On the other hand, as Mr. Kennedy pointed out a moment ago, there is a requirement in the imposition of any regulation in this area—there should be in others—that the action may not be capricious or unjustified because of a lack of real scientific impetus.

What I have outlined to you is based on evidence that has been produced almost solely within the laboratories of the district by a staff which admittedly is not expert in petroleum technology. I have indicated we have tried to get guidance from the best available experts in this area, but until we have facts which establish not only that there is a difference among these fuels, but that the degree of difference that can be produced under operating road conditions is substantial, substantial enough to justify the action. I think any control or regulation based on this evidence would be—well, we will say preliminary, and certainly unjustified at the present time.

Mr. HOLIFIELD. This is where you are appealing for the Federal Government, possibly through the Bureau of Mines, which is a Federal agency, to furnish you with some expert assistance which would stand up in a court of law to justify a position that you might want to take in the future?

Mr. CHAMBERS. Yes, sir; and I should point out that, to correct one statement that was made on the record this morning, so far as the Federal Government is concerned, there has been activated at Bartlesville, Okla., the Bureau of Mines Petroleum Research Station, a very sizable research operation analyzing exhaust components in relation to the composition of the fuel. This is already producing results, and I am happy to say some of the results at least are in support of what we have observed.

Mr. HOLIFIELD. Are these research operations there at Bartlesville being paid for out of this air-pollution fund which the Congress passed?

Mr. CHAMBERS. Yes, sir; they are. As you are probably aware, the interagency agreement, under which the air-pollution funds are ad-

ministered, gives to the Surgeon General the authority for defense of the budget, or request for funds. He makes the request based on prior requests made by the Department of the Interior, Department of Commerce, and other departments that have an operating hand in the actual prosecution of the work. So that this particular project is being carried—in effect, there is a contract with the Bureau of Mines by the Public Health Service.

Mr. HOLIFIELD. Well, the answer, then, is "Yes"?

Mr. CHAMBERS. That is right.

Mr. HOLIFIELD. That the Bureau of Mines is a contracting agency with the Bureau of Public Health, and that the funds do come from the moneys provided by the Congress?

Mr. CHAMBERS. Further than that, there is one other fairly major contract which has been activated since July with the Bureau of Mines again. This time it deals with the exploration of the possibility of catalysts for the oxidative decomposition of the exhaust. This is another approach.

That work is also being done by the Bureau of Mines at the Bruceton station, combustion station, of the Bureau of Mines, near Pittsburgh, Pa.

Those two are, to my mind, the major invasions or incursions into the actual automotive control problem that have thus far been activated in support of our requests to the Federal Government.

Mr. HOLIFIELD. How much does that amount to in terms of money?

Mr. CHAMBERS. I am not qualified to answer that exactly, but as I recall, the one contract at Bartlesville is on the order of $90,000, and the one at Bruceton is $80,000. This you can get from the authority, the Bureau of Mines, however.

Mr. HOLIFIELD. Do you consider this a strong enough effort?

Mr. CHAMBERS. None of us consider it as a strong enough effort.

Mr. HOLIFIELD. Are there other laboratories with adequate personnel and equipment to take these contracts in case money was available?

Mr. CHAMBERS. There are research institutes, contract institutes, available, with more or less competence.

Mr. HOLIFIELD. In other words, a stronger program could be sustained by our capabilities if the money was available?

Mr. CHAMBERS. In my opinion, yes, sir; very much stronger.

Mr. KENNEDY. Mr. Fountain, could I ask one further question?

Mr. FOUNTAIN. Mr. Kennedy.

Mr. KENNEDY. Dr. Chambers, has any automobile manufacturer submitted a device to the district for testing, up to the present time?

Mr. CHAMBERS. Yes. The automotive manufacturers group, which are working jointly on this problem, as you know, has submitted certain fuel cutoff devices which are designed to stop the flow of fuel during the deceleration cycle of engine operation, when you are slowing down.

The contention originally has been that a fairly large part of the total loss, through the tailpipe, occurs during the deceleration cycle. That being the case, and most of that being lost at that time, which is due to unburned gasoline, because the engine literally is not being powered—that being the case, it is argued a device which would cut off the free flow of fuel during deceleration, operated by a manifold

vacuum pressure, or whatnot, would have a substantial effect on the overall picture.

Some of these devices have been engineered and submitted to the district by the automotive industry within the past few months.

These have all been placed on cars and tested. One thing that has to be tested in connection with such a device, particularly on our freeway system, is the operational safety, the hazard introduced.

Some of these devices, at least, turned out to be of such a nature in terms of abrupt change without control in the movement of the vehicle on the freeway that they simply would not be acceptable on a hazard basis.

I think the present belief of both the district and of the automobile manufacturers, themselves, who submitted the devices, is that none of the devices submitted so far is anything like satisfactory. There is also another unfortunate difficulty that has arisen in connection with the study of the exhausts themselves, and their ability to produce smog.

That lies in the fact the exhaust arising from the deceleration cycle appeared to be much less smog-forming in their potentialities than those from the cruising and accelerating cycles.

As a consequence, the small reduction that would be obtained by such devices apparently has been largely offset by this difference in proportional effect.

So, at present, all we can say is, of the devices submitted by the industry, none has proved to be acceptable at all.

Mr. HOLIFIELD. Mr. Chass testified that approximately 105 tons of contaminants were being placed in the air by the 19 refineries. How much do you estimate that the automobiles are placing in the air?

Mr. CHAMBERS. The same type of organic materials that he was referring to, our estimates range between 1,000 and 1,200 tons per day.

Mr. HOLIFIELD. In other words, 10 or 12 times as much?

Mr. CHAMBERS. Yes, sir.

Mr. FOUNTAIN. Of course, it is all coming from the gas?

Mr. CHAMBERS. That is correct. It is also becoming very apparent now, I think, as the result of a discussion a moment ago—it is becoming very apparent that we can no longer be concerned with the sum of all organic substances, because it is becoming apparent that many of them, from the standpoint of activity in our smog production, are relatively innocuous.

We have to be concerned with specifying which ones we are talking about. It might well be that some of the losses from some of the refinery operations are of a character which is more effective than others.

I think it is more likely, however, that straight evaporative losses that do occur, are probably of the relatively innocuous type.

More and more we are coming to the conviction that the automobile is contributing, by long odds, the bulk of the reactive organics, olifins, that we are getting, that are causing our trouble.

Mr. DORN. Could I ask the Chair a question?

Mr. FOUNTAIN. Yes, Mr. Dorn.

Mr. DORN. Is it determined Dr. Haagen-Smit will be able to present testimony today?

Mr. FOUNTAIN. Mr. Naughton.

Mr. NAUGHTON. I understand Dr. Haagen-Smit is over at the city hall testifying now.

Mr. KENNEDY. No; he is here.

Mr. HAAGEN-SMIT. I just returned from the city hall investigation.

Mr. FOUNTAIN. We will be glad to hear from you, Doctor. Are there any other questions of Dr. Chambers? Mr. Naughton?

Mr. NAUGHTON. Dr. Chambers, you stressed in your testimony, and I think Mr. Kennedy also mentioned it, that autos and petroleum fuels are the largest single source of air pollution remaining.

Do you feel that that is true throughout the country, as well as in Los Angeles County?

Mr. CHAMBERS. Actually, if I were setting up the largest remaining sources yet to be controlled in this area, I would have to include a third one, and that would be losses from evaporative processes, involving thinners, solvents, lacquers, decreasers, wool scouring, a whole host of organic materials that are used in a very diffuse way in minor process industries, in house painting, and automobile body painting and the like.

The total loss of organics to the atmosphere from that source probably is on the order of 500 or 600 tons per day. This is sizable.

The question again is as to the smog-forming potential of that class—of those types of substances. Actually, I would include—the automobile undoubtedly, unquestionably, is the No. 1 uncontrolled source of the type of stuff we've got to be concerned with here. The second would be the evaporative loss. And then the other more or less minor contributions that remain to be controlled.

In general, the principles for control of the others are reasonably at hand.

Mr. NAUGHTON. Have you found that the increase in horsepower of automobile engines, accompanied quite often by an increase in gas consumption, has caused a greater tendency toward air pollution?

Mr. CHAMBERS. I doubt that that question can be answered on the basis of any evidence available to me, sir.

Mr. NAUGHTON. This morning we had some testimony to the effect that the automobile manufacturers had not carried out their commitments to Los Angeles County.

I wonder if any of you gentlemen could elaborate a little bit on what they may have promised to do and have not done?

Mr. CHAMBERS. I think I am not qualified to answer that.

Mr. FOUNTAIN. Mr. Kennedy?

Mr. KENNEDY. I think that would be detailed in the exchange of correspondence which supervisor Hahn had with the four automobile companies—manufacturers that he mentioned this morning.

Mr. FOUNTAIN. We have that for the record?

Mr. KENNEDY. Yes, I think it would be better for me not to attempt to interpret that.

Mr. NAUGHTON. Thank you.

Mr. FOUNTAIN. Mrs. Dwyer.

Mrs. DWYER. No questions.

Mr. FOUNTAIN. Mr. Holifield.

Mr. HOLIFIELD. No questions.

Mr. FOUNTAIN. Just one more question.

This problem generally speaking, could be substantially solved if the automobile people and the petroleum people got together and were willing to spend enough money, couldn't it?

Mr. CHAMBERS. Do you want me to say "yes"?

Mr. FOUNTAIN. Yes or no.

Mr. CHAMBERS. Yes. Not only spend enough money, but I would like to clarify one point. I don't believe this problem can be solved by the exepnditure of money unless at the same time someone provides the interest coupled with the technical capability, and the general psychological attitude necessary to tackle a research problem objectively. Dollars by themselves, are not going to do it.

Mr. FOUNTAIN. I agree with you on that, but I think dollars will help to get that particular sort of thing.

Mr. CHAMBERS. It will help.

Mr. FOUNTAIN. Mr. Naughton.

Mr. NAUGHTON. Here in Los Angeles County, of course, the greater proportion of air contamination is caused by liquid fuels.

Now in the eastern part of the country where they burn coal, quite often there is a different pattern involved. In other parts of the country, how much of the contamination would be caused by autos, and how much by other factors?

Mr. CHAMBERS. In the first place, I have no information directly on the other cities beyond particular loadings, and in the second place, I don't believe from my own knowledge, any measurements—any substantial measurements of other contributions to the atmosphere have ever been made in most other cities.

Mr. NAUGHTON. But you do feel that the contamination by auto exhausts is a major problem in other metropolitan areas?

Mr. CHAMBERS. I am aware of a number of episodes in the past 2 or 3 years that have been eye-irritating, plant-damaging episodes, in the same sense we are experiencing them here in Los Angeles.

So I infer the same problem is developing in other areas.

Mr. NAUGHTON. Thank you.

Mr. FOUNTAIN. Would you say, Doctor, that the control authorities, and those in your field, are in desperate need of the same kind of technological and scientific know-how, as the petroleum industry and the automotive industry have?

Mr. CHAMBERS. I think they are in desperate need of being able to utilize the sources of technological know-how, in those two industries, that is correct.

Mr. FOUNTAIN. Are you a doctor of engineering?

Mr. CHAMBERS. No, sir, as a matter of fact, I am a biophysicist.

Mr. FOUNTAIN. Someone asked that question; I thought I would get it in the record.

Were you through, Mr. Kennedy?

Mr. KENNEDY. Yes, sir.

Mr. FOUNTAIN. I think I would like to ask you some questions, but I will forego that at the present time, so we can hear from some of the other witnesses.

Mr. KENNEDY. Yes, sir. Dr. Haagen-Smit is ready whenever you are ready.

Mr. FOUNTAIN. Dr. Haagen-Smit, will you identify yourself for the record?

STATEMENT OF I. J. HAAGEN-SMIT, PROFESSOR OF BIOCHEMISTRY, CALIFORNIA INSTITUTE OF TECHNOLOGY, AND CONSULTANT, AIR POLLUTION CONTROL DISTRICT, COUNTY OF LOS ANGELES

Mr. HAAGEN-SMIT. I. J. Haagen-Smit, professor of biochemistry at the California Institute of Technology, and at the present time on leave of absence to direct the air pollution research work at the Edison Co. I am also consultant to the air pollution control district.

Mr. FOUNTAIN. How long have you been serving in that capacity?

Mr. HAAGEN-SMIT. About 7 or 8 years, I would say.

Mr. FOUNTAIN. Thank you. Go right ahead, Doctor.

Mr. HAAGEN-SMIT. I think that our main problem is, if we can solve our smog problem here all by ourselves—and I think that the answer is that in some instances we do like to have some aid from the Federal Government.

This aid is also necessary, because some of the problems that we have here, they extend way beyond our county borders of Los Angeles.

The question is, how to do this. It has been my principle, always, to consider this air-pollution problem as one that you want to get rid of, and we have had three principles, mainly: One is that we want to know what is in the air that bothers us. The second thing is that we want to know where it comes from, and the third item is what to do about it.

It is a very simple scheme which I believe should be placed on the wall of every air-pollution office. We here, in Los Angeles, know what bothers us. We know where it comes from. And in many instances we know what to do about it. And when we do know, I think there is a serious attempt to apply that, but the control measures that we would like to have are just too difficult.

Among those problems is the automobile exhaust problem you have heard about. Another one of those problems is at the oil and gas burning. You haven't heard very much about this, and the reason is that the automobile problem is more prevalent, I would say, in Los Angeles proper than in other areas.

That is, if you go to the southern part of this county, I would think that the percentage of nuisance is certainly higher from other emissions than that from an automobile. We, of course, refer to the petroleum industry and the airpower production. And so gas and oil burning is one of the things that we would like to see some work on.

I am doing work at the Edison Co., and we have covered the deck of the powerplant with air pollution control equipment. We have two large precipitators going. We have a certain new type of bag house going. We have been able to find out how we can cut down the oxides of nitrogen in the big burners, which is a considerable amount.

As a matter of fact, I would expect that we can cut down this about 15 percent. We have spent quite a little money in doing this for a small company like the Edison Co., and the president will forgive me for saying that this is a small company. It is a small company compared to the automobile industry.

There has been nearly $3 million that have been made available to us to do this kind of work. We have been guided by those three principles I have mentioned. I have fought with all my might, with any-

body that wanted to do research at the plant to keep those out of the gates. One of those types of ornamental research, of course, is the detonation of the house aspect, and the practical side, the aerosol studies.

We know perfectly well from other areas, from other data what those sizes are. We know perfectly well that the house aspects are of the emissions. We don't think there is any reason to repeat that kind of work.

I think there is a tendency in this whole field to always repeat. There is much less emphasis placed on the control, and that is also research but it is another type. It is an engineering, an applied research.

I had hoped that when the funds from the Federal Government were being made available that, let us say, at least three-quarters of it would have gone to excellent institutions like the Bureau of Standards and the Bureau of Mines.

Those are the places that we have in the past always taken care of the difficulties as we see here in Los Angeles and in other cities. They have the personnel. I am sure they have a background of high standing in the community, that they can be of great service, but what they have gotten now is just a token contribution for work.

Dr. Chambers mentions the work that is going on on some of the automobile exhausts. He also mentioned the work which is going along on the catalysts. I have been in correspondence with these people, and they have been to see me over here.

Their work could be speeded up tremendously. The problems, such as the sulfur-dioxide recovery that we are trying to solve here at the Edison Co., is a problem of major importance to other areas, not for us here. We are below the limit—far below the health limits—but for the whole United States, I think there are probably two major problems of nuisance.

One is the sulfur, and the other is the fluoride. It would be perfectly justified when the Federal Government makes the funds available that a good deal of this money should go to the Bureau of Mines to do this particular kind of work.

I am not saying here that health studies should not be made, but it is only that the proper proportion is found. There is no medical research which is going to reduce this smog directly. It can only work in this way, that it scares people into voting some funds for a particular project. I think that is the main thing I wanted to say.

Mr. FOUNTAIN. Doctor, in a letter to Congressman Holt, dated April 8, 1957, Dr. Burney, the Surgeon General, said:

> I think it is important to point out that with present knowledge there is no way known to prevent smog in the Los Angeles area. To be realistic, the people of Los Angeles should be candidly informed that there is no practical way to eliminate smog, and little probability of major alleviation within the immediate future.

Do you have any comment on that statement?

Mr. HAAGEN-SMIT. That is a pretty strong statement, but it would be, of course, very nice if we could turn the faucet and shut off the smog. There is no doubt it comes from the automobile, which is a large amount of material, and the private automobile has not found a solution yet for the emission from the automobile.

There are, of course, other ways to combat such emission, and one, of course, is being done by having the freeway system and a better transportation system, but, of course, we can't just suddenly do this. The means that we have found at the powerplant to cut down on its emission can, to a certain extent, be done right away, and about a week ago there was a meeting with the officials in the gas company and the Edision Co. on burning gas during smog hours—smog days. The changes which are necessary for the oxides of nitrogen will be made in a few months.

So a great deal of work is going on and has already been done, but just shutting off the faucet right away, it is obvious that can't be done.

Mr. FOUNTAIN. I think Dr. Burney modifies his statement farther down:

> Present methods of control, if rigorously enforced, can materially reduce smog in Los Angeles, but its major amelioration is not within immediate reach. Additional basic knowledge is needed on which to base more complete remedial practices. As this knowledge is developed, full control is likely to require drastic and expensive methods—

some of which you have talked about today.

> Obviously, the composition of smog must be controlled to avoid endangering personal health. Beyond this, abatement actions to reduce discomfort and economic blight involve a balance between what can be done and the cost and effects of doing it. This, of course, is a public policy decision to be determined by the people of that area.

Mr. HAAGEN-SMIT. I think that is generally true; yes.

Mr. FOUNTAIN. Mr. Holifield.

Mr. HOLIFIELD. No questions.

Mr. FOUNTAIN. Mrs. Dwyer.

Mrs. DWYER. No questions.

Mr. FOUNTAIN. Mr. Naughton.

Mr. NAUGHTON. Doctor, are you aware of duplication by the Public Health Service of research projects and research work that has already been carried out by local agencies?

Mr. HAAGEN-SMIT. I think, for example, on the ozone toxicity, there have been figures available for many, many years. It seems to me the progress made in determining the health effect of ozone has been exceedingly slow. Ozone has been known for about 100 years, and its effect on the health of people has been known for a considerable number of years.

It was about 20 or 30 years ago, quite satisfactory figures were given in regard to the toxicity of the ozone. I don't think in such a case we have to keep on repeating that. And the same is true with the ozone nitrates. It is often said we can't make potash because our ozone content is so poor. This is not actually true.

We determined ozone quite satisfactorily, and meteorologists have done this also quite properly. The only trouble is that the accuracy is, let us say, in this very low order of 0.2 or 0.3. It might be in the order of 20 percent, plus or minus, but this doesn't really interfere with the control methods at all.

Mr. NAUGHTON. Is the Public Health Service presently carrying out projects relating to ozone?

Mr. HAAGEN-SMIT. I think that the industrial hygiene, the sanitary engineering laboratory, at least until a few months ago, was still

working on the subject. Of course, just prior to that, the Army Research Foundation had made a very extensive study on ozone toxicity for the Air Force. As you know, since we are flying higher and higher nowadays, the air outside is pumped in and compressed, and then, since there is an ozone layer many many miles up in the air, the cabin gets filled with concentrations as high as six parts to a million, of ozone. This, of course, is undesirable.

You know, in Los Angeles it is about 4 or 5 parts per million, and the air pollution director felt uncomfortable. So, in that region, between 0.5 and 0.2, the ozone concentration begins to be disagreeable. So the Air Force had a very extensive project with the Army Research Foundation. I have seen the report. Those results are known, and they show pretty well that our levels are not a bad "guesstimate."

I think here is a reason to have one organization recognize the results of another organization, which, I suppose, is a rather expensive business.

Then I believe—I mention this only, let's say, as a stimulant—for a corporation—there is so much meteorological work going on by the district. This is extremely expensive. It would be very nice to be able to share this with other organizations.

Now, there is, of course, undoubtedly help from the local meteorological groups, but I am convinced that it is not full-out cooperation, let us say, from the Air Force or the Navy or some organization like that. They must have information about this basin and about air currents that we could use very well, and, if they don't have it, then they certainly should have it.

Mr. HOLIFIELD. Have you contacted these likely agencies, such as the Weather Bureau and the Air Force and other people that are interested in air currents and air compositions to find out if they have information you could use?

Mr. HAAGEN-SMIT. Their cooperation is good, but, as far as I know, there is no cooperation with the military people.

Mr. HOLIFIELD. We are spending many hundreds of million of dollars in research in the Defense Department, and certainly, if this work has been done in some phase of the research effort—and I know they are working all the time on altitude pressures and that sort of thing—it would seem to me that your suggestion that they be utilized is a good one. But I think, before we would know whether information is being properly utilized or not, we would have to have some definite knowledge. It would seem to me that this is an area where your air pollution district, or the Public Health Service, might devote a little study to find out where we stand.

Mr. HAAGEN-SMIT. I think that is correct. I have been advised by the district they never heard the Air Photographic Service have ever helped Mr. Dorn and myself to make some meteorological pictures.

Mr. HOLIFIELD. They won't make an effort to help you unless they find out they have something you need. Then the problem is going through channels to get it. Sometimes they withhold information on the basis of security or something like that. There you might be able to get a little help from Congress. We can get cooperation from agencies which heretofore have not desired to cooperate.

I would like, Mr. Chairman, to have the doctor explain to me, or to the committee, the difference between this so-called catalytic cracking and the hydrocracking, as briefly as possible.

Are you aware of these differences? Is this part of your work?

Mr. HAAGEN-SMIT. Well, yes; I would think so.

The gasoline Dr. Chambers was talking about, the reformed gasoline, has less olefins and less hydrocarbons than the catalytically cracked gasoline.

The unsaturated hydrocarbons, they are, for a certain number of reactions, a little more reactive. They oxidize easier. In the experiments carried out at the district, it was shown that, by oxidizing them, you would have more high immunization. There is more ozone formed.

This is still under debate, if this has a practical significance, and the reason for that is that the experiments have been carried out in a very special way, which would tend to increase, I would say, the criticism on the catalytic gasoline. I mean it is possible this type of experiment is being done that way.

We have other experiments in which we have shown that the compounds that are present in the reformed gasoline rise to ozone formation, and considerable ozone formation, so it certainly is not a question of no smog with reformed gasoline and smog with the other gasoline. It is a question of—it is a quantitative difference, you see? That has to be procured, to retain accuracy, before we can go to the oil industry and say, "Well, you've got to change your gasoline."

Mr. HOLIFIELD. Is the catalytic method of cracking cheaper and more economical for the oil industry?

Mr. HAAGEN-SMIT. Oh, I think a little bit, maybe. But this is not really very important, because several years ago one could hear this area was reforming their gasoline, and they have taken this over because the type of gasoline gives you a higher octane rating, for whatever value that may have. We go fast enough as it is. That is the reason they have gone over to reforming.

But in the taking up of the gasoline, there is a blend of catalytics, cracked and reformed stock.

Mr. HOLIFIELD. Do they use the catalytic method in most of the other areas of the country now? Is that considered the most modern way to do it?

Mr. HAAGEN-SMIT. No, no. Both methods are used.

Mr. HOLIFIELD. If it can be shown that the catalytic is more dangerous in the creation of more pollutants, is there any reason why there couldn't be some regulations passed by your county to encourage the use of the hydrocracking or reforming process, rather than the other?

Mr. HAAGEN-SMIT. Oh, yes. But it first has to be established.

Mr. HOLIFIELD. It has not yet been established, is that your point?

Mr. HAAGEN-SMIT. Yes.

Mr. HOLIFIELD. It has not been proven scientifically?

Mr. HAAGEN-SMIT. That is right.

Dr. Chambers agrees with me. They have tried an experiment in cars that are driving on the road. What we have now are laboratory experiments, actually. So the time isn't there yet to make any ordinance in that respect.

Mr. HOLIFIELD. Back in the days before we had the catalytic process used in the Los Angeles Basin, we didn't have smog, at least we didn't have it to the point where the average person knew about it.

Mr. HAAGEN-SMIT. But we didn't have 5 million people, either.

Mr. HOLIFIELD. That is right.

You rest your point on the fact there are many more automobiles and more cracking plants and that quantitatively you have increased the pollutants then?

If you had used only the reformed process, would pollution have increased to the point of irritating the eyes anyway?

Mr. HAAGEN-SMIT. As far as we can see now, we couldn't make a decision on that.

Mr. HOLIFIELD. I see.

Mrs. DWYER. Doctor, I wonder if you would care to comment on whether you consider the Los Angeles County area the most serious smog area in the United States today?

Mr. HAAGEN-SMIT. Well, I haven't made a survey of the situation, but I would say that there are other areas which are probably just as unpleasant, but may not be the same material that we have—certainly, it couldn't be the same material.

There are areas where there is a very high content of sulfur oxides. Those are extremely unpleasant, as far as I am concerned.

Mrs. DWYER. Would you care to pinpoint any other area of the United States?

Mr. HAAGEN-SMIT. Well, it would be rather unfriendly, I would say. But I must say it is rather obvious, if you take a plane ride to New York, especially when you make an in-between landing in Chicago, for example, you will see some very strong indications of smog.

Mrs. DWYER. Could you answer this question?

What role has the medical profession played in your fight to control smog?

Mr. HAAGEN-SMIT. Oh, I think they have in general been very helpful. I don't think that we would have gotten as far as we are now without the medical profession telling the people that their health might be endangered. So this is also an admission on my part that a certain amount of medical work is necessary. It is certainly helpful. But I believe the engineering research and control should be lumped into one, because it would be controlled and then the smog would disappear.

Mrs. DWYER. I notice in some of your literature that you talk about crop damage. Have you had any property damage caused by smog?

Mr. HAAGEN-SMIT. This has not been evaluated here in this area at all, because we know in the rest of the United States there is considerable damage to property.

Maybe there is one case where we know a little bit about it, and that is the rubber cracking. The rubber goods are cracking here faster than anywhere else. That was known to the rubber industry before we started investigating the air-pollution problem. It was known that this area had back cracking on rubber. Here you have a typical example. Since rubber is just another organic material, you can expect everything than can be attacked by ozone, such as dyes, pigments, and so on, colored goods, and things like that, they would be subject to the same oxidation. There would be damage to paint, for example, because paint has also an organic base. It might be easier to oxidize and be shown. Nobody has investigated it, however.

Mrs. DWYER. Have you had discoloration of paint on homes in any given area?

Mr. HAAGEN-SMIT. No. That is not the pigment I was thinking of. It is more organic components, such as the dyes that they use for dresses or ties, or something like that.

The dyes or the pigments that they use on houses, for example, they would not be discolored here in this area. This happens in towns such as Pittsburgh, for example. I had some bad publicity about that when I mentioned that once. There was one acute incident, where a sewer pipe was released, and the Pittsburgh resident—the next morning his house was turned from white to battleship gray.

Mrs. DWYER. How many air-testing places do you have in this county in this area?

Mr. HAAGEN-SMIT. There used to be, in the Los Angeles County area—there are now 6 stations, I believe, permanent now, and some 5 or 6——

Mr. CHAMBERS. There are seven permanent stations. There are three called mobile, located depending on the investigation underway at the present time. There are 10, in effect.

Mrs. DWYER. It is continuous?

Mr. CHAMBERS. Plus 70 weather stations we have access to for meteorological information.

Mr. DORN. It was suggested that you might inspect 1 or 2 of those, if time permits.

Mrs. DWYER. Thank you.

Mr. HAAGEN-SMIT. I would be glad to extend the invitation to the Edison plant, too. We have a station over there, too.

Mr. DORN. Mr. Chairman, I wonder if I could ask Mr. Haagen-Smit to elaborate a little bit more on one subject that he touched upon briefly?

The board of supervisors, in July, on unanimous action by the board, requested that there be brought into this particular area more natural gas that could be used in place of oils.

I think Dr. Haagen-Smit referred very briefly to a meeting that I attended last week with the president of his firm, telling of the possibility of this happening, and, because yours is an intergovernmental committee, I was wondering if there might be some way, based upon the urgent need that I am certain that Mr. Hahn and Mr. Haagen-Smit will testify to, wherein the Federal agencies involved might be alerted to make it possible for as large a supply of natural gas as possible to come to this or any other metropolitan area for use in pilot operations or any other industrial use.

Mr. FOUNTAIN. I think the committee could bring that to the attention of the proper Federal agencies. What the result will be, I don't know.

Mr. Holifield, do you want to speak on that?

Mr. HOLIFIELD. Are you speaking of the natural gas that comes in from the Texas fields, rather than the gas made locally? I was reading a letter, and I didn't get all of the import of your statement.

Mr. DORN. I was hoping Dr. Haagen-Smit might enlarge upon—he touched upon this very briefly in his statement, and, as he told you, he is directing a research program for the Edison Co., which is one of the major power producers in this area.

Mr. HOLIFIELD. Yes.

Mr. DORN. I had hoped he might enlarge upon his statement as it pertains to that subject, if he could.

Mr. HOLIFIELD. Are you using manufactured gas mostly, or natural gas from the Texas fields and the California fields?

Mr. HAAGEN-SMIT. No; this was the difficulty: The Edison plant, the Oxidental plant, and some of the others, use residual oil from the refineries. One of my tasks was to make an estimate of the possible ways of reducing the contaminants from the stack. When this estimate is made, it turns out the best thing you can possibly do for the community is get gas.

Mr. HOLIFIELD. Yes.

Mr. HAAGEN-SMIT. It happens that some of this gas is available. Some of it is in Nevada, some is in New Mexico, and some of it is in Canada. It is obvious we just can't import gas from Canada or Mexico unless some Federal agency allows it to come in.

Mr. HOLIFIELD. The placing of pipelines is a matter of private enterprise putting these pipelines in. I know of no instance where the Federal Government has prohibited gaslines from coming in.

Mr. HAAGEN-SMIT. But this has to deal with the utility committee at the State level, and there is a Federal utility committee, and they have to decide about putting in pipelines from Mexico, for example, or from Canada.

Mr. HOLIFIELD. Have there been any applications for gaslines from either Mexico or Canada which have been turned down by the Federal Power Commission?

Mr. HAAGEN-SMIT. This is still in process of being sought. I only wanted to mention that it is of extreme importance to reserve the gas for areas likely to have air pollution problems, and this becomes, of course, a Federal problem.

Mr. HOLIFIELD. Well, if you can give this committee scientific evidence which shows that the burning of residual-oil fuels creates more air contaminants, and that your company would be glad to change from that, and could afford to change economically to gas, it would certainly be information which could be used if there was a refusal on the part of the Federal Power Commission to allow a franchise to be granted into the area.

Of course, as you know, you come up against the competitive interests of gas sellers in a case like this. But it seems to me you are a long way from asking for Federal help on that as yet.

Mr. DORN. The reason I brought it up, Congressman, is this: There is pending a case, and we have—this board has authorized Mr. Griswold to appear in the past, and he has, and he will appear again upon authorization of this board at the Federal level.

We also, as the county government, are sending testimony to the State utility commission, and encouraging—it isn't our position as to who brings it. We don't care. We don't want to get involved in that private competitive situation. Our contention is it is needed here in this area, and, if it is needed in any other area where they do have air pollution problems, it should be furnished.

Mr. HOLIFIELD. I can see your point. I am not arguing against it. I am only directing my comments and questions to find out what could be done at this time, either by this subcommittee or by the California

delegation, to be of assistance to you. Are you in a position to say at this time that the use of gas produces less irritants than the use of residual oil?

Mr. HAAGEN-SMIT. Yes.

Mr. HOLIFIELD. You can prove that point?

Mr. HAAGEN-SMIT. There is no difficulty in doing that; no.

Mr. HOLIFIELD. Are you in a position to say that the company would change from residual oil to gas if they had the opportunity, or is the residual oil cheaper?

Mr. HAAGEN-SMIT. Oh, no; tomorrow they would change.

Mr. HOLIFIELD. They would change?

Mr. HAAGEN-SMIT. Oh, yes.

Mr. DORN. You see, there is a commitment to the general public, as a home-operation situation, that seems to be more paramount to the suppliers than those industrial concerns who use or would use natural gas.

Mr. HOLIFIELD. I see.

Mr. DORN. When there is a high use by the homeowner, there is a very small supply available to the industrial user. That is why we think it is important to bring as much natural gas to this and other areas as is possible.

Mr. HOLIFIELD. I think this is a very pertinent point. I am glad you brought it up.

I just advise you to keep the committee and the California delegation alerted on the time when hearings are being held on this matter before the proper Federal regulatory agencies, so that we might assist you on this.

Mr. DORN. I think another reason for bringing it up is to indicate the part that government is playing, where it is not taking any side as to which should be the supplier. This isn't our concern. Our concern is that there be a supply, and in sufficient quantities so that we can switch these industrial users over when there is imminent a bad air-pollution situation.

Of course, the ideal situation would be to have enough supply at all times. That is of course the end to which we are proceeding.

Mr. FOUNTAIN. Are there any other questions of the doctor?

Mr. HOLIFIELD. That is all.

Mr. NAUGHTON. Dr. Haagen-Smit, are you generally familiar with the Federal program for air-pollution research and technical assistance?

Mr. HAAGEN-SMIT. I think so.

Mr. NAUGHTON. Do you have an idea of approximately how much of the federally financed research is being devoted to engineering research in the prevention of smog, and how much is being devoted to medical research on the effects of smog?

Mr. HAAGEN-SMIT. Well, I would say you have the medical research, but this has to be taken rather broadly. You have the analytical part, you have the meteorological part, and that is strictly what I call applied research.

I would say that last part would probably be in the order of maybe $200,000, or something like that, or $250,00, at the most.

Mr. NAUGHTON. In other words, out of the several millions of dollars that have been made available, only about $250,000 is being spent on what you might call applied research?

Mr. HAAGEN-SMIT. Yes. That is my question. I would like to see that increased.

Mr. NAUGHTON. You answered the next question I was going to ask.

Mr. HAAGEN-SMIT. I see.

Mr. CHAMBERS. The amount of extras covered this year in the program, as I was given it, during the discussions here with the Federal people in regard to allocation, they indicated 40 percent of the total appropriation would go into the medical program of the Public Health Service, and 60 percent goes into the engineering, meteorological and other factors. This includes the allocation to the Bureau of Standards, the Bureau of Mines, the Weather Bureau, and other agencies—Federal agencies, which are participating.

Those interagency transfers, themselves, amount to several hundred thousand dollars.

Mr. HAAGEN-SMIT. I think that this is not quite—I don't agree with that. I took my figures from the report of June 1957, and some of the extraneous information. I think if you really scale it down, you don't get anywhere near 60 percent.

Mr. CHAMBERS. I am really quoting.

Mr. HAAGEN-SMIT. And also, of course, you were talking about the future. I am talking here about what has happened. I think my statement still stands.

Mr. NAUGHTON. Dr. Chambers, in the comment that you just expressed, are you speaking from your own knowledge, or are you simply relaying to us the position that the Public Health Service takes as to the percentage division?

Mr. CHAMBERS. As I indicated, that information was the result of a direct question I presented when the Federal representatives were here discussing the program with us. I am not quoting.

Mr. NAUGHTON. Then the Public Health Service apparently takes the position it is spending that proportion. Of course, Dr. Haagen-Smit disagrees.

Mr. HAAGEN-SMIT. Yes. You have to go over it point by point. There are differences of opinion on what is used in the control work and what is used in the academic work. You have to go over each point, and there is a difference of opinion possible. But I consider even a 50–50 division, I think is unjustified.

Mr. NAUGHTON. What would you think would be the most practical division of these funds applied to research and long-range research?

Mr. HAAGEN-SMIT. I would say this is rather difficult to guess at, but I would think if some 75 percent was applied to research and control, and about 25 percent for other items, I think that would be more reasonable, a more reasonable way of handling the funds.

Mr. FOUNTAIN. Under the theory that an ounce of prevention is worth a pound of cure?

Mr. HAAGEN-SMIT. That is right; yes. That is 1 to 16, sir.

Mr. NAUGHTON. Doctor, undoubtedly the concentration of smog in Los Angeles, and other areas where it is a problem, is not beneficial to health. I think everyone agrees on that.

In the concentrations you have been experiencing recently, has smog actually been dangerous to health in the short run?

Mr. HAAGEN-SMIT. We have only the results from the State public health to rely on. Dr. Breslau, especially, has done quite a little work on that. He hasn't found any definite evidence that there was damage to the health, but I think this is so immaterial. We just don't like it. I don't need the opinion of the medical profession, and a certain number of deaths, to do everything we can to get ahead of it.

This brings up, of course, a question which I think is misunderstood about the medical history in this field.

We know, since the State public health has not found any deaths, excess deaths, that the symptoms will be very difficult to find.

Since the symptoms of smog are more of a nuisance type, it isn't very possible to design an experiment in the laboratory where you can find that.

Suppose you have a panel of some 10 people, and you would determine if 1 person became uncomfortable, suppose 1 out of that 10 became uncomfortable, that would be terrible, because we have 5 million people here, and you take 10 percent, there would be 500,000 people that would require emergency treatment at the hospital. If 1 person got sick, we would have in Los Angeles, on our hands, about 500,000 sick people.

There is no experiment designed so that you could statistically determine what the reasonable level would be.

I think what the committee of the district did, the health committee, in setting the level a 0.5 for ozone, was a group level. Everything that has come out after that has more or less been confirmed on that. But it is always a guesstimate. No survey can determine this level with any degree of accuracy. We have controlled the smog long before we have done the other work.

Mr. NAUGHTON. Would it be fair to say that even if it were to be shown that smog did absolutely no damage to health whatsoever, that Los Angeles County and other areas would still want to control it just as much as they do now, because it is such an irritation to people and because of the economic disadvantages?

Mr. HAAGEN-SMIT. I would come to that conclusion. That would certainly be my personal conclusion.

Mr. NAUGHTON. Doctor, are you in a position to express an opinion as to whether the Public Health Service, in setting up its research projects, has taken sufficient advantage of the information gathered by State and local air pollution control?

Mr. HAAGEN-SMIT. I think that is in all of these contracts. Yes; I think there has been the desire to cooperate and gather information. I think in general all that is true.

Mr. NAUGHTON. Have they consulted with the local air pollution control authorities in determining the direction which the air pollution research should take?

It is your feeling, I understand, that too great a proportion of the available funds is being spent on nonapplied research, and not enough on applied research for immediate control?

Mr. HAAGEN-SMIT. Yes; that is right, but that is a matter of looking at the problem in different ways, in a personal manner. The public

health authorities are more likely to attach more importance to the health aspect than somebody who is more interested in engineering and in chemistry.

So there has been constantly a change of opinion. Dr. Chambers has been often in Cincinnati. As a matter of fact, he is partly responsible—he has contacts, and is exchanging opinions all the time.

Mr. NAUGHTON. Have there been any systematic attempts by the Public Health Service to ascertain the needs that local officials think should be taken care of?

In other words, do they come to you and say what you would like to have done?

Mr. HAAGEN-SMIT. Yes; that is right.

Mr. NAUGHTON. Did they follow the advice you gave them?

Mr. HAAGEN-SMIT. I might not be persuasive enough.

Mr. FOUNTAIN. Are there any other questions of the doctor?

Thank you very much, Doctor.

Dr. Chambers, we have called on you to answer a number of questions propounded to others as well as to yourself.

I don't know whether you have had an opportunity to make a statement of your own yet or not.

If not, we would be glad to hear from you.

Mr. CHAMBERS. I think, sir, practically everything I had made a brief note on that might have been said, has already been covered, more or less, with one possible exception. I think we have to recognize, at least so far as the research requirements of this problem are concerned, we are operating with two conflicting perspectives. I say conflicting in the sense that they apparently have to be processed concurrently, and the objectives are not always compatible.

In the first place, as has been indicated, we have here a rather urgent critical situation in which a situation has developed for whatever reason that has to be faced and alleviated immediately.

On the other hand, we have here, and as a national problem, the probability that air pollution, arising from technological processes, and changed technological processes, will be with us continuously from here on out. People can't live in the United States without polluting the atmosphere to some etxent, and with some types of pollutants.

I think we have clearly, in thinking about the relative roles of the local agencies and the Federal agencies, we have to balance these two perspectives, because, in my opinion, the Federal agency, with its cognizance of the—necessary cognizance of the good of the whole people, should carry the ball, so far as the long-range perspective is concerned, the potential health impacts, the principles, methods, and knowledge necessary, to prevent a recrudescence of the type of thing that has already occurred here, to prevent its occurrence in other places.

Therefore, I think it is only reasonable that we should have, at the local level, which I represent now, a feeling that there ought to be increased supports at the local level to meet the immediate problems that face us at the local level. This I support wholeheartedly.

The activities of the district are all being in that particular direction. For that reason, I feel it is also reasonable for people outside

of this area—Federal people—to maintain that the long-range perspective should be maintained by Federal purview.

It doesn't surprise me, therefore, to hear a certain amount of conflict when there are these two points of view to be reconciled.

The second thing I would like to point out is that while I agree that we would use Federal funds in this area on the immediate local problem effectively, and they would assist us in cleaning up this local problem, and in turn assist other areas in meeting this problem when they face it, I nevertheless feel that both the district and the Federal Government—from the standpoint of the district, and the long-range standpoint of the Federal Government—there is a great deal to be desired in Federal participation for the reason that the Federal Government has a facility for tapping technical resources outside of this immediate area which are not available to the local authorities.

Therein lies one of the most important functions of the Federal Government.

We have a local problem which will be a problem which will present itself to, I think, almost every municipal entity in the United States as the situation develops. We have a prototype of a problem that exists almost everywhere else.

I think it behooves not only the Federal Government, but the local agencies as well, to consider ways and means of bringing to bear on this problem in Los Angeles all of the technical resources that are available in the country. I say that in full recognition of the fact that we do have enormous technical resources, but they are not all available for this type of work. In fact, the competition for technical assistance of this sort is so keen that even the Federal Government has had difficulty in recruiting a few persons they promised to supply us for direct assistance out here.

Anything that can be done at the Federal level to expand the base of effort will be helpful locally. I cannot subscribe to the idea that—while I recognize that we have the problem in this area, this is the beginning; this is where the problem itself should be studied and its nature established—but I cannot agree it is more possible to study, we'll say, control devices for the tailpipe of an automobile in Los Angeles than it is in Detroit.

We should go where every technical know-how exists and make every possible use of it. Therein, I think, lies the key between the relationship of the Federal research agency and the local research agency.

The Federal Government can assist us, and we in turn can assist the Federal Government in making this type of knowledge available for application in a great many other communities. This is a field of philosophy I possibly shouldn't have interjected, and here I apologize to that extent, sir.

Mr. FOUNTAIN. Are there any questions? Mrs. Dwyer?

Mrs. DWYER. No questions.

Mr. FOUNTAIN. Mr. Naughton.

Mr. NAUGHTON. Dr. Chambers, is it your feeling that the Federal Government is making a real effort to employ and to utilize the services of the most competent personnel available in the air pollution research field?

Mr. CHAMBERS. Yes——

Mr. NAUGHTON. Could they practically do more? Let me put it that way.

Mr. CHAMBER. I think I will have to say they have made a conscientious effort to develop interest in conducting this type of work in technical agencies where they exist—as far as my knowledge goes.

Mr. NAUGHTON. Is it your feeling the Public Health Service is the best Federal agency to administer the engineering phases of air-pollution control and research?

Mr. CHAMBERS. I am not prepared to say it is the best Federal agency to administer the engineering phases, since you speak of it in that way.

On the other hand, I think it is generally accepted that the reason for interest in air pollution locally, and elsewhere, is primarily related to the health and welfare of the people of the United States, and I think it is by reason of that that it logically belongs in the Department of Health, Education, and Welfare.

Mr. NAUGHTON. Let me put it this way: Would you say at the present time that the Public Health Service would be the best agency to guide the overall direction of this program and, if so, is it because it is presently primarily a health problem, or is it primarily a nuisance?

Mr. CHAMBERS. The distinction between nuisance problems and health problems has always been a difficult one to make in connection with water pollution, as well as a variety of other things.

The placement of responsibilities for that sort of thing statewide, in various States and various localities, has been solved differently in individual cases.

I think the question of whether a particular agency is the best or most competent to handle a program of this type does not depend on the agency, but on the men in the agency. On that I make no further comment.

Mr. NAUGHTON. I take it as a Reserve officer in the Public Health Service, you feel perhaps you are not in as free a position to express an unbiased opinion on this particular subject as someone else might be?

Mr. CHAMBERS. Usually I am not biased by that or many other considerations—I am not embarrassed by the thing, let's put it that way.

Mr. NAUGHTON. But perhaps this line of questioning might be somewhat embarrassing.

Mr. CHAMBERS. No, sir; I don't think the question is embarrassing. I think it is one that simply cannot be answered with my frame of reference. I have no basis for saying that one Federal agency could administer a program better than another.

Mr. NAUGHTON. Dr. Haagen-Smit just indicated to us that he didn't feel at the present time that air pollution in the present concentrations was a health problem.

What comment do you have on that?

Mr. CHAMBERS. I don't believe that is quite what Dr. Haagen-Smit said. I think he indicated that none of the evidence that has been accumulated in surveys that have been made by the State health department during the past—well, since 1954—have revealed any evidence that there had been an excess of deaths over normal as the result of smog.

I think this is a matter on the record. So far as the health effect is concerned, the only other thing we have to go on is a survey of medical opinion locally, and it appears that a majority of local physicians are of the opinion that smog has contributed to the deterioration of their cases in some instances.

There is no specific way of tying this down as yet. All we can say is that we have a body of we'll say "bedside impressions" that smog has produced a health effect, but we have no scientific evidence yet to support that view.

Mr. NAUGHTON. I think we would all agree smog certainly isn't beneficial to health. Do you also feel that, regardless of what effect it may have on health, the people of Los Angeles County and other areas in the United States are going to want to have air pollution cleaned up because of its inconvenience or irritation?

Mr. CHAMBERS. I have been here only 18 months, but on the basis of that 18 months, I would say I don't believe it would make the slightest difference, they would still want it cleaned up if it were definitely known it was not producing a health hazard directly.

Mr. NAUGHTON. Could you describe for us briefly, Doctor, from your experience at the local level, and also at the Federal level, what system the Public Health Service has for the exchange and dissemination of information concerning air-pollution control?

Mr. CHAMBERS. There are quite a variety of means of communication being developed. This has been a matter of rather frequent conference and discussion among the air pollution control groups of the country.

There are a series of planning conferences that are held annually, in which both the medical and the foreign aspects of the program are discussed, with representatives invited from academic, industrial, governmental, and other agencies which have technical competence. These are ostensibly used in assisting the development of the program of the service, and at the same time they afford a means of direct communication—these various investigative agencies—one with another.

There is also a recently developed bibliographic service, which the Public Health Service has contracted to the Library of Congress in an effort to get a current distribution of abstract cards covering published work in air pollution from all over the world.

These are distributed free to cognizant institutions and agencies.

There is a direct effort to maintain consultant relationships—I'm still a consultant to the Public Health Service on its air-pollution program. Mr. Griswold is on the advisory board to the Surgeon General, National Advisory Board.

And there is very frequent exchange of visiting personnel at all levels of operation, policy level and working level.

I think for the program—this may sound a little funny—but for a Federal program as new as this one is, I think the development of communications with other agencies has been a little better than normal.

Mr. NAUGHTON. Do you feel that there would be value in the Public Health Service expending a little more of its research effort out here in cooperation with the local research program?

Mr. CHAMBERS. I very definitely do. I think this could be accomplished effectively by 2 or 3 means, and would result in 2 or 3 benefits.

One would be by an expansion of the system we have set up of obtaining direct assignment of competent people, technical people in various disciplinary fields.

Two would be by increased support for the demonstration grant type for testing the validity of survey operations or control operations in this area where they are potentially applicable in other areas.

And I believe this would have not only an immediate impact on our problem, but would at the same time tend to peak back an accumulation of experience and skill, so that that would later be built into the Federal program as it applies in other areas.

Mr. NAUGHTON. Have those recommendations been conveyed to the Public Health Service?

Mr. CHAMBERS. Yes, they have, they have been discussed. I think they have been made in no formal way, but they were a part of the recommendations that were discussed when the Federal people were here last spring. The deliberations of that discussion resulted in the letter which was returned from the Surgeon General embodying concurrence with our request, to some degree within the capabilities of the—funded capabilities of the service, as outlined to us at that time.

That letter, the actions of that letter, indicated compliance with this general notion.

Mr. DORN. I wonder if I might interrupt just a moment, Mr. Chairman?

Mr. FOUNTAIN. Mr. Dorn.

Mr. DORN. In talking to counsel after lunch, and also this morning, I determined that perhaps there might be some other things in the way of a field inspection trip that you might be interested in. I would like to know if you can devote a couple of hours tomorrow morning as I would like to have my secretary before she goes home, cancel out some appointments I have so I might be with you, with the thought that it would be advantageous to you to first inspect by air, either through our air-to-ground control service, or by helicopter, the inversion situation and the basin in general.

We thought it might be interesting for you to visit the laboratories, and we thought also it might be interesting for you to see the monitoring system that we have at various places. I have arranged with the sheriff for helicopter service at 10 o'clock. We would like to arrange for the other parts of the tour, too, if this is your pleasure, and it is convenient for you to do so.

Mr. FOUNTAIN. What is the pleasure of the committee?

I'm not so sure I will be there, if my cold continues to get worse, but I think the committee is receptive to the idea.

So if you will make your plans, we will govern ourselves accordingly.

We still have some more pebple to hear from. Were you through, Doctor?

Mr. CHAMBERS. Unless there are more questions.

Mr. NAUGHTON. Just one more.

Do you feel that there has been more recognition by PHS of the problems of local authorities with respect to applied research of late, and that the tendency is to improve the cordination in that area?

Mr. CHAMBERS. The tendency is to improve the coordination. There is a definite effort in that direction. I am not sure that I understand the first part of your question.

Mr. NAUGHTON. Has there been more recognition by the Public Health Service of the importance of applied research?

Mr. CHAMBERS. Again, all I can refer to is the answers I obtained from the service during my conversation, and I think that is second-hand testimony.

Mr. NAUGHTON. Do you think there would be value in utilizing what I understand is an existing teletype network among Federal agencies, so that local air pollution control authorities could obtain immediate answers to questions with respect to air-pollution problems?

Mr. CHAMBERS. I'm not aware of the type of emergency question that would require that sort of dispatch in handling it.

Mr. NAUGHTON. Perhaps not necessarily emergency questions, but in order to enable them to obtain speedy answers.

Mr. CHAMBERS. I think we can get all the information by United States mail. We would be happy to get it that way.

Mr. NAUGHTON. Thank you.

Mr. FOUNTAIN. Thank you very much, Doctor.

Mr. Fuller?

Mr. KENNEDY. Congressman Fountain, Mr. Fuller asked leave to be excused. There was no one else down at the district. He stated he believes that Dr. Chambers and Mr. Chass and those representing the district had taken care of any situation, because you were not particularly interested in the local enforcement features.

I think he would like to have in your record the summary of criminal court cases for the period from January of 1955 to the first quarter of 1957, showing in the aggregate that 7,511 cases were filed, that 6,955 were completed, that there were 6,547 convictions, and that fines were assessed amounting to $301,000.

I think he wanted you to have that. The document, the fact that the district was going after the large corporations—everyone who was in violation of the Air Pollution Control Act, and in the aggregate it involved many organizations and many people.

So if I may hand that in for him, that is the only specific request Captain Fuller made.

Mr. FOUNTAIN. If there is no objection, this will be made a part of the record.

Is there a desire on the part of the committee to get information as to who was involved?

Mr. HOLIFIELD. I don't think so, it is a matter of enforcement.

(The document referred to is as follows:)

Air Pollution Control District, County of Los Angeles, investigation and records section of enforcement division

Period	Criminal court case summary						
	Filed	Completed	Convicted	Dismissed	Acquitted	Fines assessed	Fines collected
January to June 1955	1,184	1,113	1,034	53	26	$59,580	$33,623
1955–56 fiscal year	2,749	2,493	2,292	141	60	101,148	57,564
1956–57 fiscal year	3,060	2,931	2,822	81	28	114,217	69,272
1st quarter 1957–58	518	418	399	16	3	26,199	12,955
Total	7,511	6,955	6,547	291	117	301,144	173,414

NOTE.—As of Oct. 30, 1957, a total of 248 cases have been processed in the month of October 1957.

Mr. FOUNTAIN. Do you care to make any other statement in connection with enforcement or any other phase of this problem, Mr. Kennedy?

Mr. KENNEDY. That is in confirmation of what Supervisor Dorn announced this morning. It has been the very firm policy of the board of supervisors to have a strict and uniform enforcement policy and show no favor to any individual or organization, big or little, and I believe that the consistency following that policy has built up a confidence in the minds of the people that we have objectively gone forward on such a program.

Now, I brought from my files three opinions. One relates, generally, to the overall instructions given to the air-pollution control director, which documents this strict enforcement policy, and not to be included in your record necessarily, but just for reference, I would like you to have it in your files.

Mr. FOUNTAIN. Good. The committee will receive it, and consider it along with the other information.

(The material referred to is in the subcommittee files.)

Mr. KENNEDY. Then I have already handed to you the automobile opinion. Then there is another that deals with air-pollution control board. They forbid burning rubbish for a limited period as a test, and then the corollary opinion for the long pull. That shows the consistency of our policy in strict control. I will hand those to counsel.

Then, because we feel whatever this committee can do in reviewing the pollutants that are involved in the air-pollution warning system will be beneficial to other areas, I would like to have you have a copy of our opinion on this regulation 7 that relates to the emergency action program.

And, on the legal side, just the general background of the right under the law, under police power, to adopt reasonable rules and regulations, not only under an air-pollution control act as we have in California, but under the police power given in most States by the Constitution.

I would like to submit a report which I prepared for the 50th anniversary of the Air Pollution Control Association of the United States, which was presented at their meeting at St. Louis.

Mr. FOUNTAIN. Thank you.

Mr. KENNEDY. And a report to the board of supervisors of May 9, 1954, that documents the history, legal, and administrative aspects of air-pollution control in the county of Los Angeles.

And, fourth, a reprint from the Vanderbilt Law Review on air pollution, its control and abatement.

These reports having been prepared by myself, as county counsel for the county of Los Angeles, and attorney for the air-pollution control district.

Mr. FOUNTAIN. Do you have any further statement to make?

Mr. KENNEDY. I would like to, as attorney for the district, thank the committee, and express my view at the end of the day that I believe it has been most helpful for you to have come to Los Angeles, and I believe that, out of the publicity that will be attendant upon this hearing, and the relationship to the activities of the automobile industry, itself, that we are hopeful of getting, I think that the committee and its hearings will have served to stimulate their endeavors and

bring about a genuine commitment on their part to do the things that they promised 4 years ago that they would do.

I think that, already, your series of hearings in the country, as I interpret the increased interest on the part of the United States Health Service since the committee was formed, and since you announced your itinerary—I believe with Dr. Burney's letter, I think we are going to get a very fine cooperation from the United States Health Service.

So, I am grateful for your coming to Los Angeles.

Mr. FOUNTAIN. Thank you very much, Mr. Kennedy. There are just one or two questions I would like to ask you.

Congress has entrusted Federal funds for air pollution research, training, and technical assistance to the Public Health Service. Do you, Mr. Dorn, or any of the other county people, have an opinion as to whether any other Federal agency ought to have some direct responsibility in addition to possible existing contractual participation through the Public Health Service?

Mr. KENNEDY. Would you like to respond first?

Mr. DORN. You go ahead.

Mr. KENNEDY. Because Dr. Louis McCabe, who is in charge of the Smoke and Fumes Division of the Bureau of Mines, was the first air pollution control director for the county of Los Angeles after we activated the district, I personally have a very high regard for the activities of the Bureau of Mines. I feel that they should be placed upon a parity with the United States Health Service.

I feel, also, that there are a number of private contracting institutes and agencies in the country that could furnish the skills necessary that would, from the standpoint of saving time, obviate the necessity of the Federal agency creating its own laboratory and recruiting its own personnel, and that some of these assignments could be made by contract, and I would recommend that policy.

Mr. FOUNTAIN. Now, I think it was Colonel Herbert who read the mayor's statement this morning, in which the mayor made six specific recommendations. Have you had occasion to read the mayor's statement?

Mr. KENNEDY. Yes.

Mr. FOUNTAIN. I have not had a chance to compare the mayor's recommendations with the commitments which have been made by the Public Health Service. Do these recommendations go beyond the commitments which have already been made by the Public Health Service?

Mr. KENNEDY. I think an examination will disclose that they are within the framework of the nine that were committed by Dr. Burney.

Mr. FOUNTAIN. If the Public Health Service carries out its commitments, will you be reasonably satisfied?

Mr. KENNEDY. I would not wish to bind the official position of the district, because, at this point, on a matter so important, I should say that the board of supervisors makes the policy for the district. But I would say for the fiscal year 1958, and possibly into the next fiscal year, if those were carried out, that very great benefit would ensue, and that they would be fulfilling their part in the program.

I still think, before the balance of the $20 million is spent or allocated, that the overal review of the major purpose of the legislation should be considered, and that, if possible, a concentration be made upon making progress in the field of the automobile exhaust.

I feel, conversely, that, if that is done, that one thing will be beneficial to the people of the entire Nation in the metropolitan areas.

Mr. FOUNTAIN. Do you care, Mr. Dorn, to comment on that question or to respond to the question that I asked Mr. Kennedy?

Mr. DORN. I am not familiar with Mayor Poulson's statement, except I heard it this morning. I would think on those points—you say there were six of them—if they were carried out, and if the spirit of the requests that we have made for cooperation is carried out, that we would be greatly appreciative. We, of course, as I said before, are never satisfied; we are always seeking perfection, but I think this would be a wonderful cooperative step forward.

Mr. FOUNTAIN. Mr. Naughton just pointed out to me that perhaps recommendation No. 2 of the mayor went beyond the commitments made by Public Health Service.

No. 2 reads:

> Establish a Federal air pollution control agency and laboratory in the Los Angeles Basin. Such agency would correspond to a similar Federal agency for water pollution control established in Cincinnati sometime ago to study the purity of waters in the Ohio River Valley.

Mr. KENNEDY. Yes, I think it should more accurately be said that is broader than either the offer in Dr. Burney's statement or a request of the district. That is, we are not asking for a closing of the Taft Center in Cincinnati, but we do feel realistically if you want good or bad samples, the place to get them is where you got the most efficient collecting stations of any place in the world, and that would seem to make some sense.

We do know, historically, that they did establish the Taft Center there primarily in the field of water pollution. I think you go where the problem is, just like I think the automobile people in Detroit should do the research there on the devices and make the fullest use of their proving grounds.

Mr. FOUNTAIN. Is there any other information, Mr. Dorn, which you or any of the other supervisors, or your staff, feel you want to bring to the attention of the committee while we are here?

Mr. DORN. I think as long as we are discussing this 1 point you read, from Mayor Poulson's 6-point program, it is not my desire, nor do I believe the desire of this country, to seek additional revenues from the Federal source at this time. I think ours is only a desire to have the moneys that were appropriated in 1955 not be spent in duplicating situations other places in the country.

I get the impression from this No. 2 point that the mayor felt there should be a separate Federal situation developed here. I am not in favor of separate situations, I am in favor of cooperative situations wherein we are all working together on either a grant-in-aid, or a contractual arrangement of some kind.

I don't think that we should separate ourselves and carry on different—although they may be the same kind of programs—but different and individual programs.

I would say, if you want me to make a statement about this—my closing statement—this whole matter, of course, has been more or less played by ear, I hope you appreciate that.

The limitations of time has been quite exacting, and I am very sorry Mr. Griswold could not be here. As you know from earlier state-

ments, he is in Washington, appearing, I think, in this same cause, and probably in this same vein there.

I am sorry that all of the members of our five-member board could not be sure. I am pleased that Mr. Hahn was able to be here and make a statement.

I am very grateful to you for coming here, and grateful to your offer to make this an open hearing wherein additional testimony can be sent, because I think that is very important, inasmuch as it was a 1-day situation, the date had been changed—I mean there were things so that I had to limit all of my appointments today, and I am sure it has been difficult, but I hope that you have gotten from those who have testified a very broad expression of our feelings in this matter of trying to get a more cooperative, coordinated program on a national recognition level than we do presently have.

Mr. FOUNTAIN. As I indicated earlier, the committee will be very happy to receive any supplementary statements which any of you who have testified may care to submit to the committee for inclusion in its record, and also statements from others who you would like to have express their views to the committee.

In fact, there are some interested private citizens here today who would like an opportunity to be heard, and I have advised them that we will be glad to receive their statements for consideration.

(The statements referred to appear in the appendix as exhibits G and H on pp. 150 and 152.)

Mr. DORN. For the benefit of the record, and for the benefit of the committee, this morning we have sent a letter to each of the other board members telling them of your open policy and your request that additional testimony be sent.

I have also written to our State senator who has been so helpful to us in our program at Sacramento, and he is very anxious, Mr. Richards is very anxious to send a statement, too, that he hopes you will give consideration to, because more and more we are finding this is a problem for all of us, and it involves cooperation between all of the various levels of government that are affected.

I think when your counsel and yourselves review this record of today, and those that will be sent in the future to you for consideration, that you will have as good a picture as we could possibly present to you in this short a length of time.

Mr. FOUNTAIN. Mr. Holifield.

Mr. HOLIFIELD. As a Member of Congress representing the particular area in which we are now sitting, I wish to thank the chairman of this subcommittee for his acquiescence to my request, and I want to thank Mrs. Dwyer for her attendance here today, and our colleague, Mr. Lipscomb, who was here most of the day.

I personally want to express my thanks to you, Mr. Dorn, and Mr. Kennedy, and your staff, for the information that you brought to our attention today.

I am sure this is going to be very helpful to the subcommittee in dealing with the Public Health Service, and also it is going to help the California delegation, I think, in cooperating with you folks back on the Federal level.

Mr. KENNEDY. Thank you.

Mr. DORN. Thank you.

Mr. FOUNTAIN. I would like to say that the two private citizens who would like to be heard, and whose testimony we will be glad to receive are, Mr. Frank L. Alexander, of Wilmington, Calif., a member of the Southern California Retail Lumbermen's Association, and Mr. George Fisher, executive secretary of the California Clean Air League.

We will be very glad to receive your statements. I think Mr. Naughton has given you the address where you can file them.

Mr. Naughton has one question which he would like to have answered now, and several questions he would like to read into the record so you can supply supplementary information later.

Mr. NAUGHTON. This question is devoted to enforcement, and perhaps Mr. Kennedy is in a position to give the information.

Have the local installations of the Federal Government been cooperative in not violating your air-pollution control ordinances, with their physical facilities?

Mr. KENNEDY. I suggest that Mr. Chass answer that, Mr. Chairman.

Mr. FOUNTAIN. Mr. Chass.

Mr. CHASS. Generally speaking, yes. I believe that there are a few that are yet to be completely controlled.

Mr. NAUGHTON. These questions which I am going to read into the record are primarily for Mr. Griswold, who was unable to be here. We will send him a copy of the record so that he can read them, but we would also be glad to have anyone else who is here furnish any pertinent information which is prompted by these questions.

First of all, I would like Mr. Griswold to comment on whether he believes that sufficient advantage is being taken by the Public Health Service of the information that has been gathered and the research that has been conducted by State and local air-pollution-control authorities. I would particularly like to have him give any examples that he may have, if there are any, of unnecessary duplication by the Public Health Service of work that has been carried on at the local level, or, if it exists, of unnecessary duplication of work by two different localities because of the fact they were unaware that similar research had already been done.

I would also like to have a greater breakdown of the figures which Mr. Dorn gave us with respect to the funds expended by Los Angeles County, and the funds expended by the Federal Government, so that we might have for our record a breakdown of the funds expended on enforcement activities and funds expended for research. As to the funds expended for research, if you have that information available, we would also like a breakdown as to the amount of that research which is primarily devoted to application in air-pollution control, and that which is primarily devoted to medical research.

We would appreciate it if Mr. Griswold would advise us whether he believes that the advisory committee, which has been set up—I believe since this subcommittee began its study of this situation—is contributing substantially to improved economy and efficiency in the operation of the Federal program, and whether he believes it has additional potential values which might be realized.

We would appreciate, also, having any specific suggestions that any of you can make as to improvements in economy and efficiency that might be made in the operation of the Federal program.

(The information requested appears in the appendix as exhibits C and D on pp. 124 and 133.)

Mr. FOUNTAIN. Do you have any further comments or questions?

Mr. HOLIFIELD. No.

Mr. FOUNTAIN. Mrs. Dwyer?

Mrs. DWYER. No.

Mr. FOUNTAIN. I think I can say, on behalf of the committee, that we are very happy to have been here with you. Because of the nature of your problem here, we have made this a separate and distinct hearing from the hearings which we have heretofore been conducting in the field of intergovernmental relations with particular reference to Federal grants-in-aid. We have been to Boston, Mass.; New York City; Chicago; Kansas City, Mo.; Denver, Colo.; San Francisco; and here in Los Angeles today.

We will continue our regional hearings in the field of intergovernmental relations in New Orleans and Miami, and conclude in Raleigh, N. C. When Congress reconvenes in January, we will have additional hearings, at which time we hope to call in representatives from appropriate Federal agencies.

Again, we are happy to have been here with you, and I want everyone to feel free to submit to the committee any additional information which you may have which you feel will enable us to give this problem the proper study that it ought to have.

Is there anything further?

Mr. NAUGHTON. No.

Mr. FOUNTAIN. The committee stands recessed until the call of the Chair.

(Whereupon, at 5:05 p. m., the subcommittee adjourned to the call of the chairman.)

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APPENDIX

EXHIBIT A. CORRESPONDENCE BETWEEN THE INTERGOVERNMENTAL RELATIONS SUBCOMMITTEE AND THE UNITED STATES PUBLIC HEALTH SERVICE CONCERNING THE AIR POLLUTION RESEARCH AND ASSISTANCE PROGRAM

APRIL 23, 1957.

DR. LEROY E. BURNEY,
The Surgeon General, Public Health Service,
Department of Health, Education, and Welfare,
Washington, D. C.

DEAR DR. BURNEY: The Committee on Government Operations has been requested by a unanimous resolution of the California congressional delegation to conduct a thorough investigation into the air pollution research and assistance program of the United States Public Health Service. The resolution further requests that the investigation cover whether or not moneys appropriated by the Congress thus far have been properly utilized in communities and States where the problems of air pollution are most acute.

The Committee on Government Operations has referred this matter to the Intergovernmental Relations Subcommittee. Chairman Fountain has directed the subcommittee staff to obtain preliminary information concerning the subject for presentation to the subcommittee.

It would be appreciated if you will provide the subcommittee with the following:

1. A brief description of the responsibilities of the Public Health Service under Public Law 159 of the 84th Congress and other applicable legislation, and a general outline of the actions taken to carry out such responsibilities.
2. The names of individuals having primary responsibilities in the air pollution control program, the nature of their responsibilities, and a brief biographical description of such individuals.
3. A summary of expenditures under the program, including the number and types of personnel employed and the locations at which they are stationed.
4. Such other explanatory material concerning the air pollution control program as may be readily available.

Since the subcommittee expects to take up this matter at an early meeting, it would be appreciated if this material can be furnished by Wednesday, May 1. If all of the material cannot be assembled by that date, it would be appreciated if you will furnish at that time such material as can be prepared.

Your cooperation will be appreciated and, I am sure, will be very helpful to the subcommittee. If there are any questions concerning the material desired I would be pleased if your office will contact me.

Sincerely,

JAMES R. NAUGHTON,
Counsel, Intergovernmental Relations Subcommittee.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE,
Washington, D. C., May 1, 1957.

JAMES R. NAUGHTON,
Counsel, Intergovernmental Relations Subcommittee, Committee on Government Operations, House Office Building, Washington, D. C.

DEAR MR. NAUGHTON: This is in reference to your letter of April 23, 1957, requesting preliminary information desired by the Intergovernmental Relations

Subcommittee in connection with its consideration of the air pollution research and technical assistance program of the Public Health Service. The information requested has been assembled and is transmitted herewith.

With respect to the resolution of the California congressional delegation that the committee investigation cover "whether or not moneys appropriated by the Congress thus far have been properly utilized in communities and States where the problems of air pollution are most acute," we are enclosing also a copy of the Surgeon General's letter of April 8, 1957, to Congressman Joe Holt which in part deals with this subject.

If there are further details or additional assistance which the subcommittee may wish, please advise us.

Sincerely yours,

W. P. DEARING,
Acting Surgeon General.

APRIL 8, 1957.

Hon. JOE HOLT,
House of Representatives.

DEAR MR. HOLT: I was glad to have the opportunity to discuss with you the air-pollution program of the Public Health Service and am pleased to comment further on your inquiry regarding this activity as it relates to control of Los Angeles smog.

The authority and responsibility for regulatory control of air pollution in Los Angeles rest with local officials. The Public Health Service has no authority to engage in an air-pollution-control program in Los Angeles or any other area. The Federal Air Pollution Act is quite explicit in restricting Federal activity to the fields of research, training and technical assistance.

I think it is important to point out that present knowledge there is no way known to prevent smog in the Los Angeles area. To be realistic, the people of Los Angeles should be candidly informed that there is no practical way to eliminate smog and little probability of major alleviation within the immediate future. The public should not be misled on this point by direct promises or implications. Present methods of control, if rigorously enforced, can materially reduce smog in Los Angeles but its major amelioration is not within immediate reach. Additional basic knowledge is needed on which to base more complete remedial practices. As this knowledge is developed, full control is likely to require drastic and expensive methods. Obviously the composition of smog must be controlled to avoid endangering personal health. Beyond this, abatement actions to reduce discomfort and economic blight will involve a balance between what can be done and the cost and effects of doing it. This, of course, is a public policy decision to be determined by the people of that area.

The primary reason for the unusual smog conditions in Los Angeles is well understood. The area is in a natural saucer or basin, hemmed in by mountains on three sides. At times the overcast by a phenomenal warm air blanket presses in and retains pollutants normally dispersed into the upper atmosphere and accentuates the tendency of smog to build up. The ever-increasing population densities and the economy of the area create conditions that influence the severity of smog episodes.

The efforts taken in Los Angeles to reduce pollution emissions have not been able thus far to produce satisfactory conditions. However, in all fairness, this situation should not be charged to laxity on the part of the Federal Government. As you know, such charges have been made.

There has been the implication that the Public Health Service should "allocate" more funds to Los Angeles. Under the terms of the act, no provision is made for allocation of funds directly to States or cities. The funds are for research, both by Public Health Service technical personnel, and through grants-in-aid to investigators in universities and other institutions; for technical assistance and consultation to localities; and for training of scientific personnel. The extent of this authority for Federal activity in the field of air pollution is widely known to local and State authorities.

In carrying out this threefold program, the Public Health Service, with the aid of its advisory committees, seeks to collect from all sources the best available information on air pollution and to disseminate it to State and local experts in the field.

Contrary to public statements, the Public Health Service has channeled a considerable portion of its resources directly to Los Angeles and to California.

Actually 14 percent of the research funds thus far appropriated have been used in California. This is far more than has gone to any other State. Some $500,000 has been expended in the State, including more than $200,000 in the Los Angeles area. Of our limited scientific staff trained in this specialty, more have been assigned to Los Angeles than to any other area. In addition we have four officers on detail to the California Health Department for statewide work on air pollution. Beyond this, research and investigations in other areas produce information of value to Los Angeles, just as data from Los Angeles is important to other areas.

If the Public Health Service cooperative program with California is considered to be unsatisfactory, this should be stated by the State and local officials with whom we work. In addition to our frequent technical sessions in the State, each year we meet in California with these officials to work out the program for the succeeding year. For example, the program for next fiscal year will be reviewed next month, the week of May 20, at meetings in Berkeley and Los Angeles.

This is a national program and we have a responsibility on request to work with all areas experiencing air-pollution problems. The primary focus for the Public Health Service's technical assistance and research activity is the Robert A. Taft Sanitary Engineering Laboratory in Cincinnati. This center is staffed by personnel trained in the methods and techniques of research in environmental health hazards, among which air pollution is one. Our technical and scientific personnel assigned to air pollution, therefore, have the full benefit of the experience of other investigators in related fields and have continuing access to the excellent laboratory facilities with which the center is equipped. With present resources, to establish a separate Public Health Service laboratory for air-pollution research in Los Angeles or some other city, as has been suggested, would be both uneconomical and, in our present judgment, not in the best administrative interests of the program as a whole.

As you requested, I am attaching a listing and description of our research activities in air pollution. Immediately applicable results cannot be expected overnight. Anyone familiar with this field recognizes the need for further research both on health effects as well as on causes and prevention. This fact, of course, is well known to you and to your colleagues in both the House of Representatives and the Senate who played such an important part in the passage of the bill. The criticisms of the research projects underway do not, we believe, take sufficiently into account this existing need. It is no exaggeration to say that it is to research that we must look for better means of coping with the smog problem in Los Angeles and in other areas.

I can fully appreciate the public concern in Los Angeles about smog and the impatience of the people to have the situation corrected. It is important, I believe, to keep the public fully informed on the complexity of the problem and the true status of progress, including what is not known as well as what is known about control possibilities. The people should understand that regulatory control is a local responsibility and should be apprised of what control actions are being taken, those that are contemplated, and why. They should know that complete elimination of smog is unlikely in view of the topography and economy of the area and that the full extent to which it can be suppressed is as yet indeterminate.

Within the overall framework of our respective responsibilities, we all should get on with the job at hand. This we propose to do, continuing to work in California with the State health department and with local air-pollution control authorities.

Sincerely yours,

L. E. BURNEY, *Surgeon General.*

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Appendix I. Responsibilities and Activities of the Public Health Service Related to Community Air Pollution

The Public Health Service has long been interested in community air pollution. Under the authority of the Public Health Service Act (42 U. S. C., ch. 6A) limited activities were carried on relative to sampling and analysis of community air; some consultatory services were provided to States and communities in response to their requests; a few research grants were made to university investigators concerned with the studies of health effects from air pollutants; and one major field study of an acute air pollution episode was conducted following the disaster which occurred at Donora, Pa., in 1948.

The Donora disaster was intensively studied by the Public Health Service, utilizing the medical, engineering, and scientific personnel resources of the Division of Industrial Hygiene (now known as the occupational health program). This Division has accumulated a great deal of knowledge from its many years of experience (going back to pioneering work started in 1910) in dealing with exposure to airborne contaminants, both gases and dusts, within industrial plants. In dustrial hygiene research has continued for almost half a century an important concern of the Public Health Service, and the Service has worked steadily to help develop State and local health units for the control of in-plant industrial health hazards. Many of the techniques and much of the knowledge now being applid to air pollution study and control originated in the industrial hygiene field.

Public Law 159, 84th Congress, provided a broader basis for an organized program relating to community air pollution in the Public Health Service. This act declared the policy of Congress to be to preserve and protect the primary responsibilities and rights of the States and local governments in controlling air pollution and to provide for the Federal conduct and support of research and technical assistance related to the control of air pollution, in recognition of dangers to public health and welfare and damage to property or interference with its use. Specifically, the act authorizes the Surgeon General, under the supervision of the Secretary of Health, Education, and Welfare—

1. To prepare or recommend research programs for devising and developing methods for controlling air pollution, in collaboration with other organizations and agencies;
2. To encourage cooperative activities by State and local governments for the control of air pollution;
3. To collect and disseminate information relating to air pollution and its control;
4. To conduct research in the Public Health Service and to support and aid the conduct of research by other public and private agencies and institutions; and
5. To conduct surveys and make investigations of specific air-pollution problems at the request of State or local government air pollution control authorities.

The act authorizes an appropriation of $5 million for each of the 5 fiscal years beginning July 1, 1955, and ending June 30, 1960, to carry on direct activities of the Public Health Service and to make grants and award negotiated contracts to State and local air pollution control agencies, other public and private agencies and institutions, and to individuals for research, training, and demonstration projects.

Since the passage of the act, the Congress has implemented it by making appropriations of $1,722,000 in fiscal year 1956 and $2,740,000 in fiscal year 1957. Program activities have been organized in the Public Health Service for the conduct

of research on various aspects of the air-pollution program and the extension of technical assistance on request by official agencies, and procedures have been implemented for the support of research, training, and demonstration projects by outside organizations. Additional details of the program which is now underway are included in the sections which follow.

THE NATURE OF THE AIR POLLUTION PROBLEM

The task of assuring clean air for our cities is rapidly achieving public recognition on a par with that universally accorded the job of providing clean water for American communities.

Both problems have gained magnitude steadily over the last century and a half since the dawn of the industrial revolution and the consequent urbanization of society in this country and in Europe. Whereas, however, the application of scientific knowledge to the control of water pollution has produced techniques that can guarantee a relatively safe public water supply to every community which avails itself of these methods, the more recently recognized twin problem of air pollution has not yet yielded to the scientific approach and still presents a more formidable challenge to American research and technological skills.

The similarity of the hazards which both impure water and impure air contain for our cities—health hazards and economic hazards alike—must not interfere with a clear recognition of the striking contrast between our understanding of the two problems at the present time.

Although our technical knowledge of water pollution problems cannot be said to be entirely complete, the control of such problems is now feasible to a major extent because we possess three types of knowledge:

1. We know diseases that may result from impure water.
2. We know many pollutants in water that can interfere with its potability or other uses.
3. We know engineering procedures to remove or neutralize these specific polluting elements.

It must be frankly acknowledged that, to consider the health aspect, alone, we do not at this time yet know (1) what specific diseases may be caused or accentuated by air pollution; (2) the identity and concentrations of specific community air pollutants that are actually inimical to the maintenance of good health; (3) how to initiate and carry through practicable engineering programs designed to remove from the air many specific pollutants once they have been identified as injurious to health.

Lest this be interpreted as too sweeping a confession of ignorance, it should be emphasized that certain air pollutants (of industrial and other origins) are already well known, and effective methods for their reduction or elimination have been demonstrated in many communities on a large scale.

Nevertheless, it would be premature to claim that we yet understand either the health effects of many already identified pollutants or the pattern of control measures that may be required to cope with pollutants that may be positively incriminated in the future as injurious to the health of the community.

A pessimistic statement of the case might be that we stand today, so far as actual scientific knowledge is concerned, in respect to air pollution, about where we stood a half-century ago in respect to water pollution. An optimistic statement of the case, however, would be that we now have behind us a half-century of scientific progress and a recent record of phenomenal success in the solution of public-health problems.

The nature of air pollution cannot, in short, be defined with scientific clarity at this stage, but the record of our mobilization of resources—of men, money, and equipment—to discover, comprehend, and cope with the facts of air pollution, gives promise of steady and rewarding future accomplishment.

In response to an informal request from the Office of the President, the Secretary of Health, Education, and Welfare in 1954 established an ad hoc Interdepartmental Committee on Community Air Pollution, with representatives from the Departments of Agriculture, Commerce, Defense, Interior, Health, Education, and Welfare, the Atomic Energy Commission, and the National Science Foundation. The Committee stated that "Safeguarding the public health is the most compelling reason for extending Federal assistance on community air pollution, although economic losses and nuisance considerations also are important in the total problem." In discussing acute episodes of air pollution, the Committee pointed out that, "Both the specific chemicals themselves and the concentrations which result in annoyance, discomfort, physical irritation, disabling illness,

permanent injury, or even death have yet to be determined." Stressing its belief that "existing gaps in knowledge concerning air pollution * * * can be filled only by coordinated research specifically directed to the problem by competent scientists and engineers," the Committee expressed its conviction that "at least 2 years' concentrated effort will be necessary to build up to the desirable level of research activity. Present judgment estimates 5 years' intensified effort as a minimum necessary before the production of major research findings."

Three factors control the air-pollution problem in any given city; they are, respectively, topography, meteorology, and human activity. First, the geographical location of a city (whether it is situated on a wide plain or is surrounded by hills or mountains, for example) can influence the behavior of air masses above a community. Second, temperature inversions can limit the volume of air over a city into which air contaminants can mix and low-velocity winds bring minimum quantities of fresh, clean air into this restricted volume. Third, a great variety of air pollutants result from man's activities, such as the operation of factories, the use of motor vehicles, and the burning of refuse.

The revolution in types of fuel that has occurred in the last half-century has greatly complicated the air-pollution problem. In 1900 nine-tenths of fuel energy in the United States came from solid fuels; today 70 percent comes from liquid and gaseous fuels. Visible smoke problems, which could be dealt with by relatively simple abatement measures, have been superseded by the more complex contamination of gases, vapors, and particulates. Human sense organs no longer give adequate warning of the existence of community air pollution.

THE PUBLIC HEALTH SERVICE PROGRAM

In its first 2 years of operation the air-pollution program of the Public Health Service received $4.46 million from congressional appropriations ($1.72 million in fiscal year 1956 and $2.74 in 1957). Approximately four-fifths of this amount has been used for research and one-fifth for technical assistance.

The Public Health Service has organized this new program within its existing administrative framework, with the Bureau of State Services taking major responsibility for the intramural research, contract, and training segments of the program, and the existing mechanism at the National Institutes of Health being used for the processing of research grants.

Within the Bureau of States Services, the engineering and physical sciences elements of the program are handled by the Division of Sanitary Engineering Services; the studies of the effects of air pollution on human health are the responsibility of the Division of Special Health Services. The Robert A. Taft Sanitary Engineering Center and the Occupational Health Field Headquarters, both in Cincinnati, Ohio, furnish research laboratory facilities for the two Divisions.

In developing its air pollution research program, the Pacific Health Service has not only utilized the competencies of its own organization but has placed special emphasis on enlisting competencies found in other Federal agencies, and in universities and other institutions in every part of the country. The complexity and extent of the problem require fullest utilization of research competence wherever it is found throughout the United States.

The health effects or medical aspect of the program concerns itself with studies designed to determine which air pollutants, if any, cause or intensify specific disease conditions or otherwise adversely affect the population. Only through such studies can we learn what pollutants must be removed from the air, and what elements may safely be left in the air. Only by observing the effects of polluted air in the laboratory and on human beings themselves over a considerable period of time can scientific conclusions be reached.

The research problem here contains a large number of variables. On the one hand, there is a wide range of contaminants in the air that are suspect; on the other hand, there is also a wide range of disease conditions involved, many of them chronic and many still of unknown origin.

Health effects studies carried on directly by the Public Health Service have included investigations of the toxicity of ozone and the oxides of nitrogen, alone and in combination with other pollutants, of organic peroxides and hydroperoxides, and of the sulfur compounds of hydrocarbons.

Through research contracts the Public Health Service is supporting health studies by universities, including the following: the effects of hydrocarbon-type smog on animal enzyme systems; the effects on animal tissue cultures of exposure to various air pollutants; an epidemiological followup of the sequelae of the acute air pollution episode at Donora, Pa., in 1948.

The engineering segment of the air pollution research program is concerned with several principal questions: (1) What pollutants are in the air and in what concentrations? (2) Where do they come from? (3) What interactions take place and what new compounds are formed? (4) How does the weather affect concentrations of air pollutants? (5) How can specific pollutants best be controlled?

Some 20 research projects are now underway in Cincinnati (Robert A. Taft Sanitary Engineering Center), as direct operations of the Division of Sanitary Engineering Services. Current projects include: the development and improvement of field sampling equipment for continuous monitoring of pollutants; development and equipment of analytical methods, using chemical, physical, and biological means (the use of plants as pollution indicators, for example); evaluation of available control procedures; evaluation of pollution resulting from specific industrial or community activities (oil refining, burning of municipal waste, operation of motor vehicles, and the like); and fundamental studies of the relationship between atmospheric variables and community air pollution levels. The feasibility of the use of models for investigating the atmospheric transport and diffusion of pollutants is also being studied.

A national air sampling network composed of some 80 sampling stations has been established, with the cooperation of State and local authorities, for the collection, identification, and measurement of air pollution in every major population center in the country and in representative nonurban areas (there is at least one sampling station in each State). Samples of particulate matter collected by the network are analyzed at the Sanitary Engineering Center for metals, sulfates, chlorides, nitrates, benzene solubles, radioactivity, and total solids.

Five research contracts have been awarded to non-Federal organizations by the engineering segment of the program. These contracts are concerned with methods of sampling and analysis for gaseous contaminants, procedures for differentiation between fuel sources of contamination, and means of removing particulate matter from high-temperature gas streams.

There have been to date some 40 research grants to universities and other research institutions throughout the country, in the total amount of, roughly, $1.4 million. The research grant mechanism is considered highly valuable in making available to the Federal Government the initiative and imagination of trained investigators in planning and exploiting methods of study of the complex problems of air pollution.

The research competence of other Federal agencies is being utilized through contracts with the United States Weather Bureau, the National Bureau of Standards, the Bureau of Mines, the Department of Agriculture, and the Library of Congress. The Weather Bureau is making studies of the relationships between meteorological variables and community air pollution levels. These studies have the objective of providing means of assessment of the capacity of the atmosphere to dilute and disperse contaminants in specific locations and the development of procedures for prediction of weather conditions under which high concentrations of pollution result. The Bureau of Standards is making studies of sampling, transport, and analyses of gaseous and particulate pollutants and rapid methods appropriate for field use. The Bureau of Mines is working on three principal projects:

(1) Engineering and pilot scale investigations for an evaluation of processes for removal of low concentrations of sulfur dioxide from stack gases;

(2) Principles of incinerator design and operation; and

(3) Automotive engine exhaust composition under various conditions of engine operation and fuel composition.

Similar contracts with the Department of Agriculture and the Library of Congress provide respectively for (1) studies of the use of plants as pollution indicators, and (2) the preparation, publication, and distribution of abstracts of all current technical literature on air pollution.

While the major expenditure of funds during the first 2 years of operation has been devoted to research, as was indicated, other important areas such as technical assistance and training have not been neglected.

Every community with an active air-pollution-control program has knowledge of the serious shortage of trained personnel in this relatively new and highly specialized field. The Public Health Service has moved to alleviate this situation by conducting short-term training courses on a regular schedule in Cincinnati. In fiscal year 1956 some 300 trainees attended these courses, and over 500 have attended thus far this year.

The shortage of trained personnel is likewise reflected in the many requests that have been received by the Public Health Service from State and local government agencies and other organizations in need of technical assistance on specific air-pollution problems. Within its own personnel limitations the Service has responded as frequently as possible, and has supplied assistance ranging from limited consultation service to participation in joint field studies. Examples of the latter include: Statewide appraisals of air-pollution problems in Connecticut, Washington, and Tennessee; a survey of existing air pollution and the potential contribution from a proposed oil refinery in Honolulu; surveys of air pollution in Portland, Oreg., Louisville, Ky., the northern New Jersey-New York City area, and other communities.

Grants-in-aid funds have been made available (to the total of $150,000 for fiscal year 1957) to strengthen the technical assistance program by making it possible for State and local agencies to conduct demonstration projects designed to appraise local air-pollution problems and determine the action necessary for coping with them.

Grants-in-aid have been supplied to help meet training needs through the allocation of some $91,000 to universities for developmental support of graduate-level curriculums. The first group of universities to receive these grants included Harvard, Rutgers, Cincinanti, Michigan, and North Carolina.

The Public Health Service has called upon the resources of the entire country in building up advisory bodies composed of the best qualified consultants available to review research grant proposals, applications for training and demonstration grants, and intramural and research contract project proposals. As an example of such use of advisory bodies, there is attached (appendix V) an outline of the procedure used in review of research grant applications. In December 1956, the Service convened in Cincinnati an air pollution research planning seminar attended by approximately 100 scientists from all parts of the country. Seminar committees made reports as to research needed in agricultural, meteorological, chemical, engineering, and toxicological aspects of air pollution. Similarly, smaller groups of expert consultants have been used to recommend needed research and means for its accomplishment in highly specialized professional fields.

All of the research contracts awarded by the Service have been reviewed with such consultants and subjected to further official scrutiny as to cost and other contract provisions. A National Advisory Committee for the Air Pollution Program is in the process of being assembled, with membership representing States and local communities, industry, the universities, and the public. Under the chairmanship of the Surgeon General an interdepartmental committee coordinates Federal air-pollution activities (with membership from the Atomic Energy Commission, the National Science Foundation, and the Departments of Defense, Agriculture, Commerce, and Interior).

The Public Health Service air-pollution program is concerned with the nationwide scope of the problem, and the Service devotes its available funds to undertakings that promise to yield results of significance to all areas where air pollution exists. The findings that may ultimately be anticipated from the studies in the health effects of air pollution, for example, should prove not only of national but of international value. While no two communities have identical air-pollution problems, there are many common denominators, and it

is these that recommend themselves first to the attention of a Federal agency.

Attached are listings of the research projects being carried on in the intramural program, those supported by research grants and contracts with non-Federal organizations, together with a listing of the training grants-in-aid which have been awarded.

APPENDIX I–A. ROBERT A. TAFT SANITARY ENGINEERING CENTER

SUMMARY LIST OF RESEARCH PROJECTS—AIR POLLUTION—FISCAL YEAR 1957

AP–37–1 Plant indicators of air pollution and air pollutants.
AP–37–2 Fluorine: A summary and evaluation of the problem of air pollution with fluorine and its compounds.
AP–68–1 Relationship between meteorological variables and community air-pollution levels.
AP–68–2 Description and prediction of air-pollution episodes through the meteorological approach.
AP–68–3 Feasibility of using models to investigate atmospheric transport and diffusion of pollutants.
AP–70–1 Joint district, Federal, and State project for evaluation of refinery effluents.
AP–70–2 Fabric air-filter design criteria studies.
AP–70–3 Incinerator design criteria studies.
AP–70–4 Cotton-ginning operations air-pollution studies.
AP–70–6 Development of improved smoke-inspection chart.
AP–70–7 Auto-exhaust study evaluation.
AP–76–1 Development of analytical methods.
AP–76–2 Detailed analysis of air contaminants.
AP–76–3 Investigations of reactions of simple and multicomponent systems of air pollutants.
AP–76–4 Adaptation of physical methods for analysis of air pollutants to field use.
AP–76–5 The role of exotic air in local air pollution.
AP–76–6 Development and evaluation of nonbiological indicators for presence of air pollution.
AP–76–7 Development and evaluation of instruments for sampling and measurement of air pollutants.
AP–77–1 National air-sampling network.

APPENDIX I–B. ENGINEERING AND PHYSICAL SCIENCES RESEARCH CONTRACTS WITH NON-FEDERAL RESEARCH INSTITUTIONS

1. *State College of Washington, Pullman, Wash.*—This contract is for the development of a continuous monitoring device for measurement of specific air pollutants; the device is to be adaptable to the measurement of several specific pollutants by changing the reacting solutions which are used.

2. *Franklin Institute, Philadelphia, Pa.*—This contract is for study of the collection of gaseous pollutants by compression methods and the pilot investigation of the use of long-path infrared spectrometry for continuous analysis of the ambient atmosphere.

3. *Scripps Institute of Oceanography, University of California (La Jolla).*—This contract is for dvelopment of means of differentiation of the sources of particulate pollution as between fossil fuels and contemporaneous combustible material, using radiocarbon dating techniques.

4. *Arthur D. Little Co., Cambridge, Mass.*—This contract is for development of a filter fabric for removal of particulates from high-temperature gas streams.

5. *Pittsburgh Coke & Carbon Co., Pittsburgh, Pa.*—This contract is for study of the use of activated carbon in sampling for gaseous contaminants.

APPENDIX I–C

Community air pollution research grants as of Dec. 18, 1956

Investigator	Description of project	Beginning date	Amount	
			Fiscal year 1956	Fiscal year 1957
S–1. John J. Phair, University of Cincinnati, Cincinnati, Ohio.	The design and organization of a study to relate the incidence, prevalence, and prognosis of human disease to air pollution in an urban area.	Sept. 1, 1955	$69,209	$94,340
S–2. Joseph C. Molner, Detroit Department of Health, Detroit, Mich.	A comprehensive study of the effects of air pollution on health.	do	20,000	
S–3. Paul Kotin, University of Southern California, Los Angeles, Calif.	Determination of acute and subacute biologic effects of air pollutants.	do	10,485	11,988
S–4. Delbert A. Greenwood, Richard H. Call, Utah State Agricultural College, Logan, Utah.	The effect of atmospheric fluorides on man.	do	43,107	26,600
S–5. Maurice L. Thomson, Irene Campbell, University of Cincinnati, Cincinnati, Ohio.	Classified bibliography of atmospheric pollution with particular reference to the effects on man.	do	11,730	
S–6. Bernard D. Tebbens, University of California, Berkeley, Calif.	Particulate air pollutants resulting from combustion.	Dec. 1, 1955	14,375	[1] 36,518
S–7. Heinrich Brieger, Jefferson Medical College, Philadelphia, Pa.	Absorption routes of inhaled air contaminants: intestinal versus pulmonary deposition.	Sept. 1, 1955	11,126	9,775
S–8. Mary O. Amdur, Harvard School of Public Health, Boston, Mass.	The physiologic response of animals and human subjects to atmospheric pollutants.	do	14,634	14,375
S–9. Hurley L. Motley, University of Southern California, Los Angeles, Calif.	Investigation of the effect of breathing smog air on pulmonary function in man.	do	36,784	20,470
S–10. E. Wendell Hewson, John M. Sheldon, University of Michigan, Ann Arbor, Mich.	Atmospheric pollution by aeroallergens.	Aug. 1, 1955	63,420	[1] 67,264
S–12. Horace R. Byers, University of Chicago, Chicago, Ill.	Chemical identification of submicron particles.	Dec. 1, 1955	17,013	17,997
S–13 (R). E. R. Hendrickson, University of Florida, Gainesville, Fla.	Dispersion and effects of airborne wastes from phosphate rock industry.	May 1, 1956	24,815	20,215
S–14. P. R. Merrifield, University of Southern California, Los Angeles, Calif.	Extent and seriousness of eye irritation caused by air pollutants.	Apr. 1, 1956	17,217	13,053
S–16. William Reynolds, Ross Kusian, University of Washington, Seattle, Wash.	Investigation of compounds containing sulfur in the atmosphere near paper-pulp mills.	do	15,329	15,112
S–17. Ruth Bobrov, Los Angeles Air Pollution Control District, Los Angeles, Calif.	Studies concerned with the use of plants as indicators of the extent and severity of air pollution.	do	6,340	6,340
S–18. William Reynolds, Ross Kusian, University of Washington, Seattle, Wash.	Development of a method to evaluate various techniques for determining trace concentrations of ozone in the air.	do	4,994	
S–19. William E. Ranz, Pennsylvania State University, University Park, Pa.	Analysis of mist and dust collection equipment.	Aug. 1, 1956		39,100
S–20. Fred A. Bryan, Charles M. Carpenter, University of California, Berkeley, Calif.	A study of whether exposure to smog causes the lungs to become more susceptible to infections.	Apr. 1, 1956	30,000	25,000
S–21. James Quilligan, Jr., Paul Kotin, College of Medical Evangelists, Los Angeles, Calif.	The effect of air pollutants, singly and in combination, on living tissue free of virus infection, as compared with infected tissue.	do	20,579	16,184
S–22. Louis Koenig, Herbert McKee, Southwest Research Institute, San Antonio, Tex.	A study of particulate matter from auto exhausts.	Sept. 1, 1956		22,425
S–23. R. C. Jordan, A. B. Algren, University of Minnesota, Minneapolis, Minn.	A basic study of air-cleaning engineering and evaluation.	do		21,589
S–27. Theodore S. Hatch, University of Pittsburgh, Pittsburgh, Pa.	Influence of air pollutants on the heart and lungs.	Feb. 1, 1956	28,112	31,944
S–30. Richard D. Cadle, Stanford Research Institute, Menlo Park, Calif.	Heterogeneous chemical reactions in aerosol systems.	Sept. 1, 1956		15,080
S–31. Donald F. Adams, State College of Washington, Pullman, Wash.	Biochemical responses of plant tissue to HF fumigation.	do		16,868
S–43. Philip W. West, Louisiana State University, Baton Rouge, La.	Gas chromatography applied to air pollutants.	do		25,358

Community air pollution research grants as of Dec. 18, 1956—Continued

Investigator	Description of project	Beginning date	Amount	
			Fiscal year 1956	Fiscal year 1957
S-49. Ernest J. Henley, Radiation Applications, Inc., New York, N. Y.	Radioactive precipitation of auto exhaust fumes.	June 15, 1956	$2,300	.....
S-52. J. Cholak, Kettering Laboratory, University of Cincinnati, Cincinnati, Ohio.	Background levels of selected air pollutants in communities of the Eastern United States.	Jan. 1, 1957	.....	$24,005
S-53. L. C. McCabe, New York University, New York, N. Y.	Control of health hazards and air pollution from flue-fed incinerators.	do	.....	25,251
S-58. J. W. A. Brant, College of Osteopaths, Physicians, and Surgeons, Los Angeles, Calif.	The relation of hospital admission, confinement, and incidence, of heart and lung diseases and death rates to occurrence, amount and nature of air pollution in Greater Los Angeles.	Dec. 1, 1956	.....	2,160
RG-4597. Michael J. Hogan, Charles H. Hine, California Medical Center, San Francisco, Calif.	A study of the mechanism of sensory irritation of air pollutants.	Sept. 1, 1956	.....	[1] 46,000
RG-4924. William H. Hill, University of Pittsburgh, Pittsburgh, Pa.	Application of electro-chromatography to analytical problems in industrial hygiene and air pollution.	do	.....	[1] 8,405
RG-5005. Warren A. Cook, University of Michigan, Ann Harbor, Mich.	Effects of carbon monoxide as an atmospheric pollutant on health as indicated by (1) relationship to automobile accidents in an urban area.	do	.....	[1] 44,73
RG-5006. Harold C. Hodge, University of Rochester, School of Medicine and Dentistry, Rochester, N. Y.	Agglutination and other aerosol interactions in the pulmonary retention of particulates.	do	.....	[1] 13,192
RG-5082. R. G. Smith, A. J. Vorwald, Wayne State University, Detroit, Mich.	Phenolic compounds in urban air and their biological activity.	Dec. 1, 1956	.....	19,518
RG-5083. J. W. Mehl, P. Kotin, University of Southern California, Los Angeles, Calif.	Effects of oxidizing and hydrocarbon air pollutants on the plasma proteins.	do	.....	[1] 23,200
RG-5084. J. G. Calvert, Ohio State University, Columbus, Ohio	Quantitative studies of the mechanisms of photochemically initiated oxidations in homogeneous and heterogeneous systems	Jan. 1, 1957	.....	[1] 55,243
RG-5085. A. B. DuBois, University of Pennsylvania, Philadelphia, Pa.	Acute effect of inhalation of dust particles on airway resistance.	Dec. 1, 1956	.....	[1] 1,995
Total			461,569	831,899

[1] Denotes research grants of National Institutes of Health pertaining to air pollution.

(Appendix I–D, Robert A. Taft Sanitary Engineering Center, training programs, July 1, 1956, to June 30, 1957, is in the subcommittee files.)

APPENDIX I–E

UNITED STATES PUBLIC HEALTH SERVICE, APRIL 5, 1957

List of training grants-in-aid, air pollution

AWARDS TO INDIVIDUALS

	Amount
Bernard Gutterman, Pennsylvania State University	$5,308

AWARDS TO INSTITUTIONS

Harvard University:	
Department of industrial hygiene	10,808
Departments of industrial hygiene and physiology	5,601
Rutgers University	9,833
University of Cincinnati	17,119
University of Michigan	25,000
University of North Carolina	15,120

AWARDS TO PUBLIC AGENCIES

New Jersey State Department of Health, on behalf of Lester A. Barrer (New York University)	2,075
Total	90,864

Appendix I–F. Air Pollution Medical Program

SUMMARY LIST OF DIRECT RESEARCH PROJECTS, FISCAL YEAR 1957

APM–1	Determination of geographic variations in 100 causes of death, by city, county, and metropolitan area.
APM–4	Effect of ozone and oxides of nitrogen on laboratory animals.
APM–5	Toxicity of organic peroxides and hydroperoxides at air-pollution levels.
APM–6	Toxicology of organic sulfur compounds.
APM–7	Effects of specific air pollutants on enzyme systems.
APM–12	Effects of atmospheric fluorides.
APM–17	Relationship of sudden changes in industrial activity to changes in morbidity and mortality.
APM–19	Correlation of geographic variations in cause of death with industrial indexes.
APM–20	Relationship of residence of disabled veterans to disease progression.

Appendix I–G. Air-Pollution Medical Program

SUMMARY LIST OF CONTRACT RESEARCH PROJECTS, FISCAL YEAR 1957

APM–2	Baylor University College of Medicine: Effects of air pollutants upon enzyme systems of the blood and other tissues.
APM–3	University of Nebraska Institute for Cellular Research: Effects of air pollutants upon tissue cultures.
APM–8	University of Pittsburgh School of Public Health: Aftereffects of an air-pollution "episode" (Donora).
APM–9	University of Miami School of Medicine: Toxicologic screening of nitroso compounds and other Los Angeles type air pollutants.
APM–10	Vanderbilt University School of Medicine: Biologic behavior and effects of sulfur oxides.
APM–11	California State Department of Public Health: Relationship of Los Angeles type smog to chronic bronchitis.
APM–15	United States Census Bureau: Development of geographic indexes of industrial activity in relation to air pollution.
APM–16	Vanderbilt University School of Medicine: Community health effects of soft-coal-type pollution.
APM–18	Chicago Health Department: Mortality variations by census tract.

Appendix II. Names of Individuals Having Primary Responsibilities in the Air Pollution Program, the Nature of Their Responsibilities, and a Brief Biographical Description of Each Individual

Public Law 159 assigns the principal responsibility for the air-pollution activities described therein to the Surgeon General of the Public Health Service under the supervision of the Secretary of the Department of Health, Education, and Welfare. The immediate operational responsibilities within the Public Health Service have been delegated to the Bureau of State Services of which Assistant Surg. Gen. Otis L. Anderson is Chief and Assistant Surg. Gen. Theodore S. Bauer is Deputy Chief.

The air-pollution program of the Public Health Service is organized in two operating divisions of the Bureau of State Services. The program related to the effects of air pollution on human health is the responsibility of the Division of Special Health Services; that portion of the program related to engineering

and the physical sciences is the responsibility of the Division of Sanitary Engineering Services.

Division of Special Health Services

The Chief of this Division is Assistant Surg. Gen. A. L. Chapman and his assistant is Dr. Elton S. Osborne. The air-pollution activities in this Division are conducted by the air-pollution medical program under the direction of Dr. Wilton M. Fisher, with headquarters in Washington, who has as his assistant Dr. Harry Heimann, Chief of Operational Research. Dr. R. A. Prindle is Chief of Programs Services.

The direct research activities of the air-pollution medical program are conducted at the occupational health field headquarters laboratory in Cincinnati, Ohio. Dr. Harold J. Magnuson is Chief of the occupational health program which is in overall charge of the occupational health field headquarters, and Dr. W. Clark Cooper is in charge of the field headquarters laboratory. Dr. Herbert Stokinger directs the specific air-pollution toxicological research activity.

Division of Sanitary Engineering Services

Assistant Surg. Gen. Mark D. Hollis is Chief of the Division and Mr. Wesley E. Gilbertson is Assistant Chief. Mr. Vernon G. MacKenzie is an Assistant Chief of the Division with immediate responsibility for research and development activities, including the overall research and developmental aspects of the air-pollution engineering program. The air-pollution engineering program in the Division of Sanitary Engineering Services is directed by Mr. Frank Tetzlaff with Mr. Ralph C. Graber as his assistant.

The direct research, technical assistance, and training activities of the Division are conducted at the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio. This is under the direction of Mr. Harry G. Hanson, and the Assistant Director, Mr. Joseph E. Flanagan. The research and technical assistance activities of the air-pollution engineering program are conducted at the sanitary engineering center under the direction of Mr. Arthur C. Stern, assisted by Mr. Frank E. DeMartini, Deputy Chief. The activities operate within the framework of several sections. The staffs of these sections have the added responsibility of technical liaison with similar groups engaged in research outside of the sanitary engineering center.

The engineering research and development section of the air-pollution engineering program conducted at the sanitary engineering center is under the direction of Mr. Andrew H. Rose.

Dr. James P. Lodge is chief of the chemical research and development section which is primarily concerned with the sampling and detailed analyses of substances from polluted air.

The operation of the national air-sampling network is under the direction of Mr. E. C. Tabor.

Dr. A. T. Rossano, Jr., is chief of the State and community services section which is responsible for providing technical assistance to State and local air-pollution-control agencies. This section participates in field studies and is presently engaged in studies at Louisville, Ky. and the New York-New Jersey study in the New York City metropolitan area.

ANDERSON, OTIS LEON

Otis Leon Anderson, Assistant Surgeon General of the Public Health Service, was born on February 8, 1903. Currently, he is Chief of the Bureau of State Services of the Public Health Service. He attended the University of Nebraska College of Medicine, receiving a bachelor of science degree in 1927 and a doctor of medicine degree in June 1929. His duties with the Service have included the clinical practice of medicine, hospital administration, and public-health administration. Since December 1944 he has been in administrative public-health work. This included his position as Chief of the Hospital Division of the Bureau of Medical Services, and subsequently the Associate Chief of that Bureau. In May 1952 he was appointed Chief of the Bureau of State Services of the Public Health Service. Dr. Anderson is a fellow of the American College of Physicians, American Medical Association, American College of Preventive Medicine, and a member of the American Association of Public Health Physicians and Association of Military Surgeons of the United States. He is also a diplomate of the American Board of Preventive Medicine and Public Health.

As Assistant Surgeon General and Chief of the Bureau of State Services, Dr. Anderson has administrative responsibility for the Communicable Disease Center, the Division of General Health Services, the Division of Dental Public Health, the Division of International Health the Division of Sanitary Engineering Services, and the Division of Special Health Services. The Divisions of Special Health Services and Sanitary Engineering Services both have air-pollution programs dealing with the medical and engineering aspects, respectively.

BAUER, THEODORE JAMES

Theodore James Bauer, Assistant Surgeon General of the Public Health Service, was born on November 18, 1909. He graduated with a doctor of medicine degree from the University of Iowa in 1933. He joined the Public Health Service in July 1933. His activities in the Public Health Service have included hospital work and regional consultant in venereal disease for region 5 of the Public Health Service. In May 1948 he was made Chief of the Venereal Disease Division. In January 1953 he was made medical officer in charge of the Communicable Disease Center of the Service. In September 1956 he was appointed Assistant Surgeon General and was made Deputy Chief of the Bureau of State Services in Washington. Dr. Bauer is a member of the American Board of Preventive Medicine and Public Health. He is also a member of the following societies: American Public Health Association, American College of Physicians, Sigma Xi (honorary), American Social Hygiene Association, American Veneral Disease Association, and the American Medical Association. Assistant Surgeon General Bauer as the Deputy Chief of the Bureau of State Services is responsible to Dr. Otis Leon Anderson and has administrative responsibilities in connection with the activities of the Communicable Disease Center, the Division of General Health Services, the Division of Dental Public Health, the Division of International Health, the Division of Sanitary Engineering Services, and the Division of Special Health Services. The Division of Special Health Services has within it the air-pollution medical program.

CHAPMAN, ALBERT LYON

Albert Lyon Chapman, Assistant Surgeon General of the Public Health Service, was born November 28, 1905. He is currently Director of the Division of Special Health Services of the Bureau of State Services of the Public Health Service. He was graduated as a doctor of medicine from the Long Island College of Medicine, Brooklyn, N. Y., in 1937 and received a master of public health degree from Johns Hopkins University in June of 1941. He entered the Public Health Service in July of 1938. His duties in the Public Health Service have, in recent years, included administrative public health work in chronic diseases and hospital surveys as well as that of Deputy Health Commissioner both in Charleston, W. Va., and Norfolk, Va. He was Assistant Chief of the States Relation Division of the Bureau of State Services from 1946 to 1949. He was Chief, Division of Chronic Diseases, of the Bureau of State Services from 1949 to 1951. In January 1951 he was assigned as regional medical director for region III of the Public Health Service. In June 1956 he was assigned as regional medical director, region II. In September 1956 he became Chief of the Division of Special Health Services here in Washington.

Dr. Chapman is a member of the American Board of Preventive Medicine and Public Health, American Public Health Association, Gerontological Society, Association of Military Surgeons of the United States, Association of Public Health Physicians, the American Academy of Preventive Medicine, and the American Medical Association.

Dr. Chapman is an Assistant Surgeon General and is in charge of the Division of Special Health Services, which includes besides the air pollution medical program, the programs of tuberculosis, chronic disease, heart disease control, accident prevention, radiological health, and occupational health.

FISHER, WILTON MONROE

Wilton Monroe Fisher was born August 4, 1912. He was graduated from the University of Oklahoma in June 1932 with a bachelor of arts degree in zoology. In June 1937 he received a master degree in entomology from the same institution. In June 1942 he graduated from the Baylor University College of Medicine

and in August 1938 he graduated from Rice Institute with a doctorate of philosophy in parasitology.

He is a member of the American Board of Preventive Medicine and Public Health and of the following societies: American Medical Association, American Association of Industrial Physicians and Surgeons, Society of American Bacteriologists, American Public Health Association, Sigma Xi (honorary), American Association for the Advancement of Science, Society of Tropical Medicine and Hygiene, and the American Society of Parasitology.

From June of 1942 to July 1948 he was assistant professor and instructor at Baylor University College of Medicine. He entered the Public Health Service in July 1948 and was Assistant Chief, Laboratory Division, of the Communicable Disease Center of the Public Health Service. Except for 2 years, from June 1953 to July 1955, during which time he was working with the Veterans' Administration, he has been with the Public Health Service since 1948. In July 1955 he was made staff assistant to the Chief of the Division of Special Health Services and chief of the air pollution medical program of this Division. His current rank in the Public Health Service is Medical Director.

Dr. Fisher is chief of the air pollution medical program and is responsible to Drs. Chapman and Osborne, the Division Chief and Assistant Chief.

PRINDLE, RICHARD ALAN

Richard Alan Prindle was born on December 28, 1925. He graduated from Harvard Medical School as a doctor of medicine in June 1948. He joined the Public Health Service in January 1951 and has worked in the Service as an epidemiologist at the Communicable Disease Center in Atlanta, Ga., and in the Arizona State Health Department. In June 1954 he was sent to Haiti under the International Cooperation Administration. In December 1956 he was made Chief of Program Services of the air pollution medical program of the Public Health Service. He is a member of the American Medical Association, the American Public Health Association, the American Society for the Advancement of Science, the Association of Military Surgeons of the United States, the American Society of Tropical Medicine and Hygiene, and the Association of Public Health Physicians.

Dr. Prindle's primary responsibility in the air pollution medical program involves the application of community health studies to determine the effects that air pollutants have on the health of the population.

MAGNUSON, HAROLD JOSEPH

Harold Joseph Magnuson was born on March 31, 1913. He was graduated from the University of Southern California, Los Angeles, Calif. in June 1934 as a bachelor of arts in chemistry. In June 1938 he graduated from the University of Southern California School of Medicine, Los Angeles, Calif., with a doctor of medicine degree and interned at Los Angeles County Hospital from May 1937 to February 1939. In June, 1939 he worked in internal medicine at the University of Southern California School of Medicine. He is a member of the American College of Physicians, the American Medical Association, the American Association for the Advance of Science, American Public Health Association, American Society of Clinical Investigation, Society of American Bacteriologists, American Society of Experimental Pathology, Society of Experimental Biometry and Medicine, Sigma Xi (honorary), and Alpha Omega Alpha (honorary). He is also a member of the American Board of Preventive Medicine and Public Health.

In 1941 he joined the Public Health Service working in the field of veneral disease. In July 1956 he became chief of the occupational health program, Division of Special Health Services, and as such is responsible for the activities of that program. Part of the occupational health program activities includes the operation of the Occupational Health Field Headquarters which is performing toxicological investigations for the air pollution medical program.

COOPER, WILLIAM CLARK

William Clark Cooper was born on June 22, 1912. He was graduated as a doctor of medicine from the University of Virginia in June 1934. He is a member of the American Board of Internal Medicine and of the following societies: Alpha Omega Alpha (honorary), American Association for the Advancement of Science, American Society of Tropical Medicine and Hygiene, American Con-

ference of Governmental Industrial Hygiene, American Public Health Association, and Industrial Medical Association. He has been in the Public Health Service since 1941. Currently, he is Chief of the Occupational Health Field Headquarters and is responsible to Dr. Magnuson for the activities of that headquarters. The Occupational Health Field Headquarters is concerned with performing certain toxicological studies for the air pollution medical program.

HEIMANN, HARRY

Harry Heimann was born on September 28, 1903. In June of 1928 he was graduated as a doctor of medicine from the New York University Medical College. He served as an intern at the Boston City Hospital and a fellow in hematology, New York University Medical College. He is a member of the Alpha Omega Alpha (honorary), American Public Health Association, American Medical Association, American Industrial Hygiene Association, and the American Trudeau Society. He is also a member of the American Board of Preventive Medicine and Public Health. In 1938 he began working in the field of industrial hygiene for the New York State Department of Labor. In April of 1943 he joined the Public Health Service and worked in the field of industrial hygiene from that time through September of 1951. In September of 1951 he was sent to India under the International Cooperation Administration and he stayed there working in industrial hygiene until August of 1953. In August of 1953 he was sent to San Juan, P. R., as chief of the bureau of tuberculosis. In May 1956 he joined the Division of Special Health Services as Chief of the Operational Research Section of the air pollution medical program. His rank in the Public Health Service is medical director.

Dr. Heimann was in charge of the medical portions of the study of the air-pollution episode of Donora, Pa., in the winter of 1948–49. He is presently serving as Chief of the Operational Research Section of the air pollution medical program.

In the air-pollution medical program, Dr. Heimann's responsibilities are to develop and conduct toxicologic, physiologic, and clinical studies to determine the effects of air pollutants upon human health.

STOKINGER, HERBERT E.

Herbert E. Stokinger was born on June 19, 1909. He graduated from Harvard College with a bachelor of arts degree in 1930 and from Columbia University with a doctor of philosophy degree in 1937 with a major in biochemistry. From 1943 to 1951 he was head of the section of industrial hygiene (Manhattan project) at the University of Rochester. In June 1951 he joined the Public Health Service and since then has been Chief of the Laboratory and Toxicologic Services of the Occupational Health Field Headquarters, occupational health program, Division of Special Health Services.

Dr. Stokinger is a member of the American Industrial Hygiene Association, the American Society for Pharmacology and Experimental Therapeutics, the Society for Experimental Biology and Medicine, the Society of American Bacteriologists, the American Society of Immunologists, Air Pollution Control Association, American Association for the Advancement of Science, American Public Health Association, American Chemical Society, American Conference of Governmental Industrial Hygienists, and the Association of Harvard Chemists.

Dr. Stokinger is responsible for directing broad programs of toxicological research, with special reference to industrial fields, and application of results of such research and investigation to problem areas in industry.

As such he directs and provides expert advice to programs of research designed to detect, analyze, and discover the reasons for the deleterious physical effects of certain materials involved in air pollution.

OSBORNE, ELTON SMITH, JR.

Elton Smith Osborne, Jr., was born October 10, 1914. He is currently a medical director of the Public Health Service and is Assistant Chief of the Division of Special Health Services. He was graduated from the Medical College of Georgia with a doctor of medicine degree in June 1937. After training as an intern as well as a resident, he worked from the years 1939 through 1943 as a health officer for the Florida State Board of Health. He entered the Public Health Service in April 1942 and has worked as a health officer in administration and in nutrition

work. He was nutrition adviser to the American mission to Greece in Athens, Greece, from December 1947 through July 1948. In June 1949 he was civil-defense consultant for region IV of the Public Health Service. He was made Assistant Chief for the Chronic Disease Division in March of 1950. In January 1951 he was Chief of Medical Programs of the Bureau of State Services. In October 1954 he was chief recruiting officer for the Office of the Surgeon General. In July 1955 he was made Assistant Chief of the Division of Special Health Services.

Dr. Osborne is a member of the American Medical Association. American Public Health Association, American College of Preventive Medicine and is a member of the American Board of Preventive Medicine and Public Health. He is assistant to Dr. Chapman, Chief of the Division of Special Health Services, who has responsibility for the air pollution medical program and the programs of tuberculosis, chronic disease, heart disease control, accident prevention, radiological health, and occupational health.

DAVID, WILFRED DENNIS

Wilfred Dennis David was born on May 11, 1916. He received his bachelor of science degree from the University of Rhode Island in June 1938. In 1943 he received his doctor of medicine degree from Middlesex Medical School, Waltham, Mass. He joined the Public Health Service in 1948, working in the field of industrial hygiene and occupational health, and served in San Francisco, Calif., Salt Lake City, Utah, and Chapel Hill, N. C. He is a member of the American Public Health Association and the American Industrial Hygiene Association.

Dr. David is the Special Health Services representative in the regional Public Health Service office in San Francisco. Because of his experience and background in air-pollution studies in Donora, Pa., he is especially valuable as our liaison officer with the air pollution medical activities in the California area.

HOLLIS, MARK DEXTER

Mark Dexter Hollis, Assistant Surgeon General of the Public Health Service and Chief Sanitary Engineer Officer, was born September 24, 1908. He is also Chief of the Division of Sanitary Engineering Services of the Bureau of State Services of the Public Health Service. He was graduated from the University of Georgia with the bachelor of science degree in June 1931, having specialized in sanitary engineering. He entered the Public Health Service in June 1926 and his early assignments included activities in shellfish sanitation, typhus fever survey and control, and stream pollution studies. From 1934 to 1939 he served as director of the division of sanitation of the North Dakota State Health Department. This was followed by another assignment on stream sanitation activities in Cincinnati, Ohio, and general sanitation activities in Washington, D. C. He served as executive officer of the Malaria Control in War Areas Office of the Public Health Service in Atlanta, Ga., and this was followed by a tour of duty as executive officer in the Office of the Surgeon General in Washington. He was made Chief of the Sanitary Engineering Division of the Public Health Service in January 1948, and for a time he also served as Associate Chief of the Bureau of State Services.

Mr. Hollis is a fellow of the American Public Health Association and he holds membership in the American Water Works Association, Federation of Sewage and Industrial Wastes Associations, American Society of Civil Engineers, Conference of State Sanitary Engineers, and Conference of Federal Sanitary Engineers.

He is a past president of the National Malaria Society and has served on the editorial board, American Journal of Public Health, the Expert Committee on Environmental Sanitation of the World Health Organization, the board of consultants of the National Sanitation Foundation, the American Sanitary Engineering Intersociety Board, and he has been a member of numerous interagency groups. He is also a member of the Potomac River Interstate Pollution Control Board. Mr. Hollis was granted an honorary doctor of science degree from the University of Florida (January 28, 1955), and he holds professional engineering registration in the District of Columbia.

Mr. Hollis is an Assistant Surgeon General in charge of the Division of Sanitary Engineering Services, which includes beside air pollution engineering program, the Water Supply and Water Pollution Control Branch, the Radiological

Health Branch, the Milk and Food Branch, and the General Engineering Branch which are all located in Washington in addition to the Sanitary Engineering Center located in Cincinnati, Ohio.

GILBERTSON, WESLEY E.

Wesley E. Gilbertson was born on September 11, 1913. He was graduated from North Dakota State College in 1935 with a bachelor of science degree in civil engineering and from the University of Minnesota in 1939 with a master of science degree in public health. From 1935 until 1942 he served in various capacities with the North Dakota State Department of Health, first as State director of community sanitation and later as district sanitary engineer. He entered the Public Health Service as a commissioned officer in 1942 and served in various headquarters and field capacities with the malaria control in war areas program, finally as executive officer. In 1952 he became Chief of the Division of Civilian Health Requirements in the Office of the Surgeon General, and in 1954 was named Assistant Chief of the Division of Sanitary Engineering Services.

Mr. Gilbertson is a member of the American Public Health Association, the American Society of Civil Engineers, and the Conference of Federal Sanitary Engineers. In 1951 he was a member of the United States delegation to the World Health Organization in Geneva, Switzerland. He is a registered professional engineer in the State of North Dakota.

Mr. Gilbertson is assistant to Assistant Surgeon General Mark D. Hollis, Chief of the Division of Sanitary Engineering Services, who has responsibility for the air-pollution engineering program as well as the programs of radiological health, water-pollution control and water supply, milk and food sanitation, and general engineering.

MACKENZIE, VERNON GORDON

Vernon Gordon MacKenzie, Assistant Chief for Research and Development in the Division of Sanitary Engineering Services of the Public Health Service, was born July 19, 1906. He graduated from Massachusetts Institute of Technology in July 1927, having majored in sanitary engineering, and he holds a certificate for successful completion of the advanced management program of the Harvard Graduate School of Business Administration. Prior to entering the Public Health Service, Mr. MacKenzie was employed as a sanitary engineer from July 1927 to June 1936 with the Sanitary District of the City of Chicago. From 1936 until January 1939 he was employed as a sanitary engineer with the Department of Public Works of Detroit, Mich. He entered on duty with the Public Health Service in February 1939 and was assigned to the water and sanitation investigation station in Cincinnati, Ohio. This was followed by an assignment to the national defense sanitation facilities program of the Service and an assignment as Deputy Director of the Public Health Division of the American Mission for Aid to Greece with headquarters in Athens. Just prior to his present assignment, Mr. MacKenzie served as officer in charge of the water and sanitation investigation station in Cincinnati, Ohio, which was transformed and expanded during his assignment into the sanitary engineering center.

Mr. MacKenzie is a member of the American Society of Civil Engineers in which he serves on the public health committee, the American Public Health Association, the American Water Works Association, the Federation of Sewage and Industrial Wastes Associations of which he is a member of the board of control, the Air Pollution Control Association, and the Conference of Federal Sanitary Engineers.

TETZLAFF, FRANK

Frank Tetzlaff was born May 31, 1910. He was graduated from the College of the City of New York in February 1932 with the degree of bachelor of science in engineering. In June of 1932 he was granted the postgraduate degree of civil engineer from the same institution, and in June 1940 he was granted the degree of master of civil engineering from New York University where he specialized in sanitary engineering. In 1940 he also matriculated at Yale University and successfully completed the course in industrial hygiene.

He is a registered professional engineer holding registration in Georgia, and he has been certified as a sanitary engineer by the American Sanitary Engineering Intersociety Board. He is a life fellow of the American Public Health Association and holds membership in the American Society of Civil Engineers,

American Water Works Association, New York Sewage and Industrial Wastes Association, National Society of Professional Engineers, Georgia Society of Professional Engineers, Inter-American Association of Sanitary Engineers, Scientific Research Society of America, Conference of State Sanitary Engineers, Conference of Federal Sanitary Engineers, Conference of Municipal Public Health Engineers, and Air Pollution Control Association.

From February 1937 to March of 1939 he served as a sanitary engineer with the Ministry of Health in Caracus, Venezuela, providing consultation in general sanitary engineering. From May 1939 to April 1940 he was employed as a safety engineer with the Liberty Mutual Insurance Co. in New York, engaging in industrial hygiene and safety activities. He then served for a year as a sanitary engineer with the Nassau County Health Department in New York which was followed by his entering on duty with the Public Health Service in May 1941 serving as a sanitary engineer in the district No. 2 office of the Public Health Service. In March 1946 he was assigned to the position of Chief of the Engineering Division of the Office of Malaria Control in War Areas in Atlanta, Ga., which during his assignment was transformed into the Communicable Disease Center. He then was transferred in May 1950 to the position of regional engineer in the region No. 2 office of the Public Health Service, and during that assignment also assumed responsibility for general sanitary engineering activities in region No. 1, with a total of 10 of the Northeastern States under his jurisdiction. During his assignment as regional engineer, he served for the period from June 1950 to March 1951 on a temporary assignment as sanitary engineer consultant to the Economic Cooperation Administration mission to Indochina. In March of 1956, he was transferred to his present position in the headquarters air-pollution program. In his present position he has administrative responsibility for the air-pollution engineering program and is responsible to Messrs. Hollis, Gilbertson, and MacKenzie, the Chief and Assistant Chiefs of the Division of Sanitary Engineering Services.

GRABER, RALPH

Ralph Graber was born on January 7, 1917. He was graduated from the Pennsylvania State University with a bachelor of science degree in sanitary engineering in 1940 and from the Graduate School of Engineering of Harvard University with a master of science degree in sanitary engineering in 1947. He received specialized training in radiological health at the Army Chemical Center and through participation in the Nevada Proving Grounds off-site program. After employment with the Pennsylvania Railroad as an engineer on maintenance-of-way, he joined the Public Health Service in 1941. He was assigned to the Texas State Health Department and served until 1944 as the sanitary engineer of several local health departments in that State. In 1944 he was assigned to the Division of Sanitary Engineering on engineering projects, and in 1947 became Assistant Chief of the Vessel Sanitation Branch. In 1949 he was transferred to Chicago as Assistant Regional Engineer for FSA, region V. In 1954 he was loaned to the Institute of Inter-American Affairs as chief sanitary engineer of the health mission to Mexico. In 1956 he became assistant chief of the air-pollution engineering program.

Mr. Graber is a member of the American Public Health Association, American Society of Civil Engineers, National Society of Professional Engineers, Conference of Federal Sanitary Engineers, Inter-American Association of Sanitary Engineering, and the Air Pollution Control Association. He is a registered professional engineer in the State of Texas.

He is assistant to Mr. Frank Tetzlaff, chief of the air-pollution engineering program, who has responsibility for the overall direction of the air-pollution program as it relates to engineering and the physical sciences.

HANSON, HARRY G.

Harry G. Hanson was born on November 26, 1909. He graduated from the North Dakota State College in 1936 with a bachelor of science degree in chemistry and engineering, and from the Graduate School of Engineering of Harvard University in 1940 with a master of science degree in sanitary engineering. Following employment as an engineering assistant with the city engineering department, Fargo, N. Dak., he entered the Public Health Service in 1936 to serve in North Dakota on community sanitation activities. From 1937 until 1942 he was employed by the North Dakota State Health Department,

finally as assistant director of the division of sanitary engineering. Mr. Hanson reentered the Public Health Service in 1942 and served in the malaria-control-in-war-areas program, finally as executive officer. In 1947 he became executive officer of the Public Health Service, and in 1952 was assigned as Assistant Chief Sanitary Engineering Officer. In 1954 he was transferred to Cincinnati as Director of the Robert A. Taft Sanitary Engineering Center.

Mr. Hanson is a member of the American Society of Civil Engineers and the Sewage & Industrial Wastes Association.

Mr. Hanson is Director of the Robert A. Taft Sanitary Engineering Center, at which place the direct Public Health Service air-pollution engineering research and technical-assistance activity is located.

FLANAGAN, JOSEPH E., JR.

Joseph E. Flanagan, Jr., was born on May 11, 1913. He graduated from Worcester Polytechnic Institute with a bachelor of science degree in chemical engineering in 1935. From 1935 until 1939 he was employed as a chemist with the Massachusetts Department of Public Health, and in 1939 he became a chemist with the Metropolitan District Water Supply Commission. He entered the Public Health Service in 1940, and his first assignment was on the Ohio River pollution survey. From 1941 until 1945 he served in various headquarters and field assignments with the Division of Industrial Hygiene (later Division of Occupational Health), finally as Assistant Chief of the Division. In 1954 he was transferred to Cincinnati as Assistant Director of the Sanitary Engineering Center.

Mr. Flanagan is a member of the American Public Health Association, the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, and the Conference of Federal Sanitary Engineers. He is a registered engineer in the State of Ohio.

Mr. Flanagan is assistant to Mr. Harry G. Hanson, Director of the Robert A. Taft Sanitary Engineering Center; the direct Public Health Service research and technical-assistance activities are conducted by the Center.

STERN, ARTHUR C.

Arthur C. Stern was born March 4, 1909. He was granted a degree of mechanical engineer from Stevens Institute of Technology in 1930 and the degree of master of science in 1933 from the same institution.

He is a member of the American Society of Mechanical Engineers and a member of the air-pollution committee of that society, as well as the American Public Health Association, American Industrial Hygiene Association, and the American Conference of Governmental Industrial Hygienists. He is also a member of the Air Pollution Control Association and the American Society for Testing Materials. He is chairman of the sectional committee on industrial ventilation (Z–9) of the American Standards Association. He is also Chairman of a Board of United States Civil Service Examiners. He is a consultant to the professional examination service of the American Public Health Association, a research associate in chemical engineering of the University of Cincinnati, and a lecturer at New York University.

From 1942 to 1954 he was chief of the engineering unit of the division of industrial hygiene of the New York State Department of Labor and he held this position until entering on duty with the Public Health Service in 1955 as chief of the community air-pollution program at the Sanitary Engineering Center in Cincinnati, Ohio.

He holds a Junior Award of the American Society of Mechanical Engineers and has published over 50 articles and papers in the field of industrial hygiene and air pollution.

Since the start of the air-pollution program of the Public Health Service, he has been responsible for assembling staff, planning programs and directing the chemical and engineering research and development being conducted at the Sanitary Engineering Center as well as the research on instrumentation, meteorology, and the technical assistance to States and communities. In addition to responsibility for the direct research in air-pollution engineering being conducted at the Sanitary Engineering Center and the technical assistance provided from that Center, he is responsible for overall supervision of the direct air-pollution training being provided by the Sanitary Engineering Center. He has responsibility for the technical aspects of liaison which is maintained with industry on air-pollu-

tion problems; he is also responsible for the maintenance of technical liaison with all contractors and negotiations with non-Federal prospective contractors. He is responsible for the maintenance of technical liaison with the work being carried on by other Federal agencies for the air-pollution engineering program and for the dissemination of technical information as it is developed.

DE MARTINI, FRANK E.

Frank E. DeMartini was born on September 7, 1904. He was graduated from the University of California in 1927 with a bachelor of science degree in civil engineering. From 1927 until 1935 he was employed as a sanitary engineer with the California State Department of Public Health. In 1955 he became water purification engineer with the San Francisco water department. Mr. DeMartini entered the Public Health Service in 1939 and was first assigned to the Ohio River pollution survey. In 1941 he was assigned to the Division of Sanitary Engineering, finally as chief of the water-supply section. In 1945 he became executive officer of the water and sanitation investigations station, Cincinnati, Ohio. In 1948 he was assigned as Chief of the Technical Services Branch of the Division of Water Pollution Control. In 1949 he was transferred to San Francisco in charge of water-pollution-control activities in that area, later as regional engineer, region IX. In 1956 he became deputy chief of the air-pollution activities at program at the Sanitary Engineering Center.

Mr. DeMartini is a member of the American Public Health Association, the American Society of Civil Engineers, the American Water Works Association, the Inter-American Society of Sanitary Engineering, and the Sewage and Industrial Wastes Association. He is a registered engineer in the State of California.

Mr. DeMartini is assistant to Mr. Arthur C. Stern, who is responsible for the direct research and technical assistance activities of the air-pollution engineering program at the Sanitary Engineering Center.

ROSE, ANDREW H., JR.

Andrew H. Rose, Jr., was born June 30, 1913. He was graduated from the University of Southern California with a bachelor of science degree in mechanical engineering in 1936. From 1937 until 1941 he was employed as a mechanical engineer with the Consolidated Steel Corp., Ltd. From 1941 until 1946 he served as an officer in the United States Marine Corps. He then entered the employment of the H. B. Berry Laboratories, Los Angeles, as production engineer, and then with the Vegetable Soap Products Co., Los Angeles, in the same capacity. In 1948 he entered the employment of the Los Angeles County Air Pollution Control District; he served in a variety of engineering capacities with the district, finally as head engineer. Mr. Rose entered the employment of the Public Health Service in 1955 as chief of the engineering research and development section of the air-pollution engineering program. As chief of this section he is responsible for the planning and conduct of a variety of research and development projects related to the engineering aspects of air pollution.

Mr. Rose is a member of the American Society of Mechanical Engineers and the Air Pollution Control Association. He is a registered professional engineer in the State of California.

ROSSANO, AUGUST THOMAS, JR.

August Thomas Rossano, Jr., was born February 1, 1916. He was graduated from the Massachusetts Institute of Technology in 1938 with the degree of bachelor of science in civil engineering. He was granted the degree of master of science in sanitary engineering by Harvard University in 1941 and a doctorate in 1954.

He holds membership in honorary engineering and scientific societies, including Sigma XI, Delta Omega, and Gamma Alpha. He was also a winner of the Delta Omega essay contest at Harvard University in 1952. He is a member of the American Public Health Association, the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, the Air Pollution Control Association, the Harvard Engineering Society, and the American Society of Civil Engineers, of which he is a member of the air pollution committee.

He has been in the Public Health Service since June 1941, serving as an industrial hygiene engineer on surveys of Government arsenals, depots, etc., until Janu-

ary 1942. He then had a 10-month assignment to the District of Columbia Health Department, organizing an industrial hygiene program, and from October 1942 to September 1948 he had assignments as an industrial engineer in the States of Washington, California, Colorado, and Alabama. These assignments were followed by an assignment with the radiological health program of the Public Health Service. Just prior to his present assignment he engaged in graduate training in nuclear physics at Harvard University in connection with the control of airborne radioactive wastes.

Dr. Rossano is now serving as chief of the State and communities section of the air pollution engineering program, with headquarters at the Sanitary Engineering Center in Cincinnati. His section is responsible for providing technical assistance to State and local air pollution control agencies. Among the field studies presently underway are those at Louisville, Ky., and the New York-New Jersey study in the New York City metropolitan area.

LODGE, JAMES P., JR.

James P. Lodge, Jr., was born February 4, 1926. He received his Ph. D. degree in organic chemistry at the University of Rochester in 1951. He then taught chemistry for 2 years before becoming principal chemist in the cloud physics laboratory of the University of Chicago for a period of 3 years. During this period he also served as a consultant in chemistry for the Cook Research Laboratory. Dr. Lodge was employed by the Public Health Service in 1955 as chief of the chemical research and development section of the air pollution engineering program. As such, he is responsible for the planning and conduct of a variety of research projects related to the chemical and physical aspects of air pollution.

Dr. Lodge is a member of the American Chemical Society, the American Meteorological Society, and the American Geophysical Union.

TABOR, ELBERT C.

Elbert C. Tabor was born September 14, 1906. He received a bachelor of arts degree in 1929 from Kentucky Wesleyan, and a master of science degree in 1930 from the Kansas State College. During the next 16 years Mr. Tabor taught analytical and biological chemistry at the Michigan State University. In 1946 he entered the employment of the Public Health Service as a chemist in the nutrition program. From 1951 until 1953 his efforts were devoted to biochemical and radiochemical investigations. In 1953 he was employed as the chemist on the initial air-pollution sampling program inaugurated by the Public Health Service under contract with the Army Chemical Corps. Since 1955 Mr. Tabor has served as chief of the national air-sampling network at the Robert A. Taft Sanitary Engineering Center, and as such is responsible for the planning and operation of a comprehensive network of sampling stations distributed among the 48 States and 3 Territories and operated in cooperation with State and local agencies.

Mr. Tabor is a member of the American Chemical Society and the Air Pollution Control Association.

WOOLRICH, PAUL F.

Paul F. Woolrich was born April 3, 1925. He was graduated from the University of Texas in 1945 with a bachelor of science degree in mechanical engineering and a master of science degree in sanitary engineering from the University of Texas in 1947. After employment as an industrial hygiene engineer with the Texas State Health Department, he became an instructor in mechanical and sanitary engineering at the Utah State Agricultural College. He entered the Public Health Service in 1949 and served in various locations with the Division of Occupational Health, finally at the field station in Salt Lake City. He was transferred in 1956 to the Robert A. Taft Sanitary Engineering Center as Chief of the Air Pollution Training Section.

Mr. Woolrich is a member of the American Society of Mechanical Engineers and the American Industrial Hygiene Association. He is a registered professional engineer in the State of Texas.

As Chief of the Air Pollution Training Section, Mr. Woolrich has the responsibility for the development and conduct of a variety of short courses on the various aspects of engineering and physical sciences as they relate to air pollution.

APPENDIX III

Analysis of air-pollution program expenditures

	Actual, 1956	Estimated, 1957
I. Research	$1,404,483	$2,060,900
Direct PHS research	494,625	795,246
Contracts with other Federal agencies	354,815	478,763
Contracts with non-Federal organizations	81,471	256,891
Grants	461,569	517,000
Overhead costs for grants administration	12,003	13,000
II. Technical assistance	242,010	478,065
Headquarters technical activities and program direction	94,700	130,300
Direct field assistance	147,310	114,300
Demonstration project grants		150,000
Regional offices		83,465
III. Training	40,000	180,000
Direct training	40,000	75,000
Training grants		105,000
IV. Central services and training of PHS personnel	16,000	21,035
Total, sanitary engineering activities appropriated	1,702,493	2,740,000

APPENDIX IV

Air-pollution-program employees on duty as of Apr. 25, 1957

	Professional	Subprofessional and other supporting personnel
Headquarters	9	21
Regional offices:		
Region IV, Atlanta, Ga.	1	2
Region V, Chicago, Ill.	1	1
Region VI, Kansas City, Mo.	1	1
Region IX, San Francisco, Calif.	1	1
Cincinnati, Ohio:		
Sanitary Engineering Center	31	41
Occupational health field headquarters	13	13
New York, N. Y.	1	
Tennessee (Nashville)	1	
Louisville, Ky.	1	
California (Berkeley and Los Angeles)	7	
Total	67	80

APPENDIX V. PROCEDURE FOR REVIEW OF RESEARCH GRANT APPLICATIONS

No research or training grant may be approved by the Surgeon General of the Public Health Service unless recommended for approval by one of the national advisory councils. The members of these councils advise the Surgeon General on program development and recommend to him those grants which should be made. Council members are appointed by the Surgeon General, with the approval of the Secretary of the Department of Health, Education, and Welfare. Each of the councils meets three times a year.

In order that the advisory councils and the Surgeon General may have the benefit of the best scientific advice on all applications for grants and awards, outstanding authorities in the major fields of research and training have been named as members of special committees, boards, or study sections. The majority of these special consultants are non-Federal scientists selected by the Surgeon General on a nationwide basis. These evaluating groups have accepted responsibility (1) for providing technical advice on applications, and (2) in conjunction with the councils, for surveying as scientific leaders the status of

research and training in their fields in order to determine areas in which additional activities should be initialed or expanded.

Additional details of procedures and policy covering grants and awards are covered in the attached booklet.

Exhibit B. Correspondence Between Intergovernmental Relations Subcommittee and Officials of a Number of Local Air-Pollution Programs

(The following letter was sent to officials of a number of the larger local air-pollution-control programs:)

October 21, 1957.

The Intergovernmental Relations Subcommittee of the House Committee on Government Operations has jurisdiction over the activities of the Department of Health, Education, and Welfare and its related agencies, including the Public Health Service. The subcommittee is presently studying the operation by the Public Health Service of the Federal program for research and technical assistance in air-pollution control. In carrying out its study the subcommittee would like to enlist the advice and assistance of local air-pollution control authorities wha are familiar with the administration of this program and have a working knowledge of air-pollution problems and the methods being used to combat such problems.

We would very much appreciate it if you could provide the subcommittee with a brief description of air-pollution problems in your area and the manner in which you are seeking to cope with such problems. We would particularly like to have your comments on the manner in which the Federal program is being carried out and the benefit you are deriving from it. It would be particularly helpful if you will describe—

1. Any criticism or commendation you may have concerning the Federal program.
2. Any suggestions you may have for obtaining increased efficiency and economy in the administration of the Federal program.
3. Any suggestions you may have for a more effective approach at the Federal level to the problem of air pollution.

Since the subcommittee may have a hearing in Los Angeles on this subject about November 1, it would be particularly helpful if we might have your comments before that time. If you reply by October 26, I would appreciate it if you will address your response to me at the St. Francis Hotel in San Francisco.

Sincerely,

L. H. Fountain,
Chairman, Intergovernmental Relations Subcommittee.

Allegheny County Health Department,
Pittsburgh, Pa., October 22, 1957.

Hon. L. H. Fountain,
Congress of the United States, House of Representatives, Washington, D. C.

Dear Mr. Fountain: In answer to your request of October 21 for some comments on air-pollution problems in Allegheny County, which might be helpful to your subcommittee study, I have the following to report:

The concentration of heavy and light industry in Allegheny County produces a significant amount of air pollution. This pollution includes the usual constituents associated with such industrial areas. These pollutants comprise fine and coarse particulate matter, odors, and gases.

In addition to the industrial activity, there is significant pollution from incineration, heating facilities, and automobiles. During the last several years, there has been an ever-increasing dust problem caused by extensive demolition of wornout structures that are now being razed to redevelop these blighted areas. For example, we have not solved the problem of burning the lumber and combustible materials that result from these demolitions. Not only does such burning cause smoke and soot problems but, in addition, pungent odors.

So far as I know, the only part of the Federal program that's being conducted in Allegheny County is the air-sampling station located on the second floor roof

of city hall, which is part of an air-sampling network. We are cooperating by operating this filter at specified periods of time designated by the Robert A. Taft Sanitary Engineering Center in Cincinnati.

Our plans for attacking this problem include a staff of 1 physician, a nurse, an industrial hygiene engineer, and 2 or 3 industrial hygienists, all of whom are now on our staff and have been working on this problem for some months, with the exception of the engineer who will join our staff November 1.

This, of course, is in addition to the 2 smoke-inspection staffs, consisting of 11 personnel for the city and 9 for the county, who confine their activities exclusively to pollution from smoke violation.

Very truly yours,

HERBERT J. DUNSMORE,
Public Health Engineer.

COUNTY OF ALLEGHENY,
Pittsburgh, Pa., October 25, 1957.

Hon. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee, Committee on Government Operations, San Francisco, Calif.

DEAR MR. FOUNTAIN: Your letter of October 21 on the question of the activities of the Department of Health, Education, and Welfare with particular reference to the Federal program for research and technical assistance in air pollution by the Public Health Service is an extremely difficult one to answer.

As a member of an ad hoc advisory committee on community air pollution demonstration projects, I might open by making the observation that the appropriation granted by Congress to the Public Health Service covering air pollution studies would appear to me to be a "pork barrel" in that the vast majority of requests for appropriations which were laid before our committee appeared to be ill-advised, poorly thought out, and to a large extent unnecessary, and not in the overall public interest.

By and large the air pollution problem in each particular locality and environment is a local problem and differs from locality to locality depending upon local meteorology, topography, type of pollutant, and numerous other variables.

No medical group, including the Public Health Service, has ever undertaken to set forth the limitations on an outdoor basis of the various forms of pollution to which human beings may be subjected. I would venture the prediction that, when such limits are promulgated, it will be found that the modern ordinance limitations in general practice throughout the country covering local air pollution control, will be vastly stricter than anything laid down as necessary from a general health standpoint.

Returning to the second paragraph of your letter, the air polution problem in Allegheny County, Pa., is derived chiefly from the emissions resulting from the manufacture of steel. In addition, we have public utility powerplants, cement mills, byproduct coke ovens, general industrial establishments, railroads, etc. The progress that has been made has been due very largely to an attitude of wholehearted cooperation on the part of steel and other industries looking to the elimination, so far as economically possible, of the various polluting effluents.

Some of the necessary steps are proving to be extremely costly and it has been recognized that progress along such lines must be made slowly and cannot be expected overnight. On the other hand, where economics prevail, such as in the use of diesel-electric locomotives in place of the steam locomotives on the railroads, the replacement and the resulting improvement have occurred in a matter of a few years.

The specific answers to your 1, 2, and 3 queries have been answered in part in the first part of this letter. In general, I do not subscribe to the activities of the Public Health Service operating out of Cincinnati to survey local areas in a program of investigation of local activities. It seems to me that these are no more a part of the function of this Service than if someone at the Federal level would come into the various cities of the country to investigate the condition of the paving of the streets. These matters are not interstate and should be handled as local problems. After all, such surveys serve no useful purpose.

There are numerous broad general problems that need investigation, probably at the Federal level, for the information of all but the specifics of the

local operation are matters that should be investigated and financed at the local level and not by Federal appropriation.

In connection with the latter, the Public Health Service could enter into a cooperative investigation with the automobile manufacturers looking to the elimination of raw gas and other hydrocarbons emitted from the tailpipes of automobiles and trucks; they could undertake, on a cooperative basis with the Weather Bureau, a more thorough investigation of the effect of atmospheric inversions on the concentration of pollution and possibly arrive at some manner in which these inversions could be broken up; more effective collection of fly ash of all types could be devised working in conjunction with the present manufacturers of this class of equipment; investigations could be carried out to a more effective suppression of all types of fumes. All of the foregoing are matters of broad general interest. Information could be made available and be useful to all of the air-pollution control areas throughout the country.

Very sincerely yours,

T. C. WURTS,
Director, Bureau of Smoke Control.

BALTIMORE CITY HEALTH DEPARTMENT,
October 23, 1957.

Congressman L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee,
San Francisco, Calif.

DEAR CONGRESSMAN FOUNTAIN: This is in reply to your inquiry of October 21 concerning the challenging and vexing problem of air pollution with specific reference to the type of program being conducted in the Baltimore City Health Department and our evaluation of and relation with the Federal program.

The city health department program began years ago but it was not until about 1952 that specific funds and staff were set aside for carrying on an air pollution control program. The program of air pollution control has progresed along two lines. Considerable effort has been made toward correcting conditons in individual plants that have been responsible for pollution conditions. Court action has been instituted in a few instances to bring about compliance with city health department recommendations. The other line pursued involves the examination of plans for new types of industries and to have incorporated at the time of construction controls placed on operations which otherwise would likely become offensive. This second line of attack has been most fruitful in that it prevents the occurrence of an adverse condition in a more economic manner and at the same time avoids the unpleasant relationships that develop between the citizens, the official agency, and the company if the proper controls were not in effect. Toward this end a specific city ordinance on air-pollution control was approved April 9, 1956, by Mayor Thomas D'Alesandro, Jr. A copy of the ordinance is enclosed for your information and you will note that the power of enforcement is placed solely in the hands of the commissioner of health. This is a strong type of ordinance but it did have the backing of the Baltimore Association of Commerce. A copy of a letter from that association on the satisfactory solution of a difficult problem appears in the same pamphlet containing the contents of the ordinance. The ordinance was first drafted by the city health department staff with the assistance of Mr. Thomas N. Biddison, the city solicitor.

In addition to routine and automatic sampling of the atmosphere, the largest achievement to date was a 23-month study of air pollution made for the Maryland State Roads Commission on the ventilation of the Patapsco River Tunnel, one end of which terminates in a highly industrial area. This entire project is costing the State roads commission $130 million and it is imperative to have an acceptable air supply available for proper ventilation. During the study numerous visits were made to potentially offending companies and conferences were held with management with the result that with proper controls the quality of air in that area has been improved materially.

With regards to the other portion of your inquiry of our relationship with the Federal program the following is itemized for your information:

1. The United States Public Health Service was called upon and gave us guidance in the establishment of a full-time program to handle air pollution matters.

2. The Federal agency also gave guidance in the drafting of the air-pollution control ordinance referred to above.

3. A number of members of our staff have taken courses on air-pollution control given by the USPHS at the Taft Engineering Center in Cincinnati.

4. Because of common air-pollution problems in a rapidly growing titanium industry we suggested that a nationwide conference be held at the Taft Center with the attendance of the widely scattered companies producing titanium. Such a conference was held and resulted in a better evaluation and recognition of the problem.

5. The city health department particpates in the national air-sampling network of the USPHS on approproximately a 2-week basis around the year.

6. Due to our interest on naturally occurring radioactivity the Taft Center personnel have been most helpful in advising us on the manner in which such a program should be carried on.

As you may conclude from the above, we have only commendation and no criticism of the Federal program. As to your request on the suggestions for obtaining increased efficiency and economy for a more effective approach at the Federal level on the problem of air pollution, it is believed that more emphasis could be placed upon research of more fundamental problems with a view toward a practical nature of control and this approach should be helpful in obtaining the objectives you mentioned.

It is hoped that these comments will be of some help to you as chairman of the Intergovernmental Relations Subcommittee of the House Committee on Government Operations which has jurisdiction over the activites of the Department of Health, Education, and Welfare and its related agencies. You may rest assured that we feel privileged in replying to your request for guidance in this field and should more detailed information be desired kindly let me know.

Sincerely yours,

HUNTINGTON WILLIAMS, M. D.,
Commissioner of Health.

BAY AREA AIR POLLUTION CONTROL DISTRICT,
San Francisco, Calif., October 25, 1957.

Hon. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D. C.

DEAR SIR: Enclosed are some publications that describe our district and its program. The Let's Clear the Air pamphlet outlines our operation. Something New in the Air outlines our broad program. The budget is self-explanatory. The Law and Regulation No. 1 show our legal status to date.

Also enclosed is a paper I presented as the keynote address at the 50th annual Air Pollution Control Association conference in St. Louis this June. I have marked in ink some of the more pertinent points (as I see them related to your inquiry).

With respect to your specific points for discussion, the following comments are in order:

1. The Federal program has been less useful than we had hoped during my work in Detroit until a year ago and my work here since then, because:

(*a*) The United States Public Health Service assumed that air pollution control programing was like water pollution programing. One error lies in the fact that there are only hundreds of points of emission of pollution to the receiving body (the water), most of them being large sewers from cities or industries, whereas there are hundreds of thousands of emitters to the receiving body (air), most of them small. Also, you can clean water before you drink it, but not air when you're outdoors. Further, many air-pollution violations are done in "sky writing," obvious to everyone—not submerged in a sewage outfall.

(*b*) The early failure of the United States Public Health Service to employ persons who were fully skilled in community air pollution control work. More recently they have been employing several of us as consultants in some phases of their program, but this moves a program that has been already shaped very slowly, as you can realize.

(*c*) The early failure of the United States Public Health Service to some extent not yet overcome to recognize that a tremendous amount of technical

assistance can be furnished to community air-pollution programs by "picking the brains" and "scouring the files" of other community air-pollution agencies so that their experiences, both successes and failures, are communicated in an organized fashion. The emphasis on "original research" grants, in fields other than impairment of health (where original work truly needs to be done) has not been closely guided by those who know the problems for which answers are "almost" ready but that will need some more skilled man-hours by competent engineers, chemists, physicists, agricultural specialists, and meteorologists.

On the commendation side, the Federal program under the Public Health Service is subsidizing training of technical specialists for this field. However, because of their rigidity as a commissioned force, and because very little internship with local air pollution control agencies has been provided, they are handicapped in practicing what they learned.

Further, the United States Public Health Service is improving the general awareness of their employees through seminars, etc. At the same time, some further exchange of knowledge is made there with those already practicing in the field. But here again, the lack of internship prevents the men from "learning by doing" right where the problems are.

The recently formed Natonal Advisory Committee on Community Air Pollution to the Surgeon General of the Public Health Service may be expected to serve a useful function in guiding the Federal program. It will be holding its second meeting in Washington on November 1. The first meeting provided orientation for the committee members. The coming meeting should provide an opportunity for healthy discussion.

2. We who are actually operating control programs need certain technical information that exists but is not available in the sense that it is not collected from those who have it, then assembled, edited, and disseminated. If the Federal program planted some technical writers in each major center of air pollution control activity with the sole function of collecting and reporting useful reports to the other local agencies, we could all move a lot farther a lot faster. It might even be useful to set up a teletype chain so that communication of questions (and answers from those who have them) could be swift and inexpensive. The fact that older comprehensive programs like those of Cincinnati, Detroit, and Los Angeles would be major sources of such information is well known already. The fact that each of many other community programs has additional useful information is not so well known. As a specific example, to learn what control equipment has worked well in a "spent brewers grain drying kiln" would take considerable contact work by a local agency faced with the problem the first time. Yet a teletype network would quickly elicit information that I happen to know exists in Cincinnati, Milwaukee, and Detroit, as well as in cities I don't know about.

3. A tremendous amount of information about weather patterns and about the measurement and control of air pollutants has been produced. That which lies in industry's files is, to some extent, not available because of legal defense reasons. Much that lies in the files of Government agencies is not available because of past military defense reasons. The declassification and publication of this information, after it has ceased to be a matter of military security, would be of obvious value to our program. The effort being expended appears to be too little. You might well explore this barrier to see whether more funds can break loose more reports, especially from the National Advisory Committee on Aeronautics, the Atomic Energy Commission, the Chemical Warfare Service, etc.

A final point on the total Federal program:

There does not yet exist a clear-cut directive requiring Federal agencies and the Bureau of the Budget to meet the spirit and letter of local air-pollution laws and programs or to require Federal agencies to follow "best practice" in buying, erecting, or installing new operations that have air pollution potential.

Although the local Federal installations and their executives are more than eager to be good neighbors with respect to air pollution, they are hampered by fiscal policies, practices, and decisions with which they must comply because of higher authority.

I trust the above comments meet your needs and that of your committee. If I can be of further usefulness, my secretary, Miss Carman, can reach me in Cincinnati or Washington, D. C., until I return to San Francisco on November 2.

Sincerely,

BENJAMIN LINSKY,
Air Pollution Control Officer.

Fifty Years Backward and Forward in Air-Pollution Control[1]

By Benjamin Linsky, President, Air Pollution Control Association, Air Pollution Control Officer, Bay Area Air Pollution Control District, San Francisco, Calif.

INTRODUCTION

A few years ago, in 1950, there were many speeches and papers in many fields of interest that reviewed and forecasted events and developments because it was midcentury.

This is a similar review and forecast.

The reason is the 50th annual conference of the Air Pollution Control Association. Other reasons and associated ideas were found, after the primary motives of the author and Air Pollution Control Association led to the decision that this discussion would be held.

The total objective of this discussion was established as being a stimulant to future action to obtain cleaner air.

It is not to contain an encyclopedic review of all applicable knowledge. Neither is it to contain a history of the Air Pollution Control Association or any single component of the generally recognized field of air-pollution control such as administration, research, development, or physical application. Instead, the backward looking is intended to sum up as much of the significance of the past 50 years as the author can assemble from his own direct experience and his own learning from the spoken and written experiences of others. The backward looking is also intended to contain such synthesized concepts as this person can develop at this time from these experiences and from the spoken and written concepts of others.

Appropriate specific credits could not be given, even if time permitted, because the author has received extensive verbal communications from thousands of specialists and interested nonspecialists during the past 9 years and he cannot identify the specific person who conceived an idea or spoke to him about his direct experiences.

This discussion's forward looking, if it is to be useful in stimulating future action to obtain cleaner air, should be more than a forecast of what is likely to occur, à la Nostradamus, Edward Bellamy, Jules Verne, Tom Swift, Jack London, Aldous Huxley, George Orwell, and the contemporary science fiction writers. It should, nevertheless, contain similar forecasts that will, in similar fashion, probably, turn out to have been completely mistaken or partially mistaken or woefully shortsighted when reread 10, 25, or 40 years from now.

It is intended, therefore, that this discussion, as it looks forward will present concepts, many of them not original with the author, that will help people decide how to act to obtain cleaner air.

Because the author is an active administrator of a community air pollution control program, and lest he be labeled an impractical visionary, it is necessary that he state here, clearly, that the concepts, especially those that tentatively look far forward, are not his proposed program of action for his community. His program of action must develop out of the logic of his community's situation, resulting from the weighing of the many factors and forces that affect design, timing and movement.

No single community or metropolitan area or region or State or Nation has ever obtained as clean an atmosphere for its citizens as air-pollution specialists have known how to achieve technically, so far as the author knows. Nor is any area ever likely to achieve such a goal, in the author's opinion. "We ain't farming half as well as we know how, now!" said the farmer.

Neither has any community, metropolitan area, region, State, or Nation ever obtained as clean as atmosphere as large numbers (probably a majority) of its citizens would like to have, so far as the author knows.

The spread between technical capability, citizen desire, and achievement can be accounted for by poor communications between people. "It sure takes some people in this man's Navy a long time to get the word," said the sailor.

During the past 50 years the greatest obstacle to clearing the air has been poor communication of information between people and groups, in the author's opinion.

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[1] Presented at the Golden Jubilee Meeting of the Air Pollution Control Association, St. Louis, Mo., June 2–6, 1957.

It is true that much of the poor interchange was due to ignorance and inertia, but it is also true that much of the poor interchange was, and continues to be, deliberate.

Information about air pollutants and their control (or about anything else) has value to anyone in the world only to the extent that it serves as a basis for future decision for action by people.

Therefore, any deliberate or unwitting interference with the exchange or dissemination of information about air pollutants has led to decisions that had inadequate basis.

I refer to those types of poor communication in the fields indicated:

Documentation: First is the inadequate organization of systems for recording storing, and transmitting information for use by those who need it.

Security: Second is the deliberate withholding of data about air pollutants for economic, political, or military defense reasons by persons or organizations.

Semantics: Third is the deliberate or unwitting use of words and numbers that are not clearly defined or clearly understood by the writer-speaker and the reader-listener.

In order to establish a better understanding, at least between those who are occupationally concerned with air-pollution control, as a prelude to a better understanding between these air-pollution-control specialists and the general members of the community, it is essential that words with specific, uniform meaning be used.

To have heard a solid fuel or metallurgical industry's technical lobbyist speak to a midwestern city council or northeastern air-pollution conference about the "insignificance of carbonaceous or metallic particles in air pollution" by references to "air pollution in a Southwest city where liquid and gaseous fuels only are used" is to have recognized the importance of avoiding the generalized terms. This is necessary if the objective is information leading to understanding leading to action.

Fifty years ago this organization held its first annual conference. It had been organized a year earlier in Detroit, Mich., as an international group with officers selected from the United States and Canada. Its members were definitely interested in the abatement of black smoke and fly ash from coal burning. The extent to which its members were interested in the metallo-mineral-petro-nutro-chemical sources and types of air pollutants is not known to the author.

The metallurgical, ore reduction, food and food waste processing, and chemical operations had many instances of excessive air pollution. As public-minded citizens with interest in a physical science it can be estimated that those in attendance at the first meeting knew a little bit about the first American trans-county boundary air-pollution case that had come into focus in the San Francisco Bay area, where an ore smelter (mineral-metallo) at Selby emitted gases and dusts that damaged vegetation in an adjacent county. This situation is believed by many to have provided the incentive for the earliest intensive technical study of air pollutants in the United States. The studies are still in operation conducted by the American Smelting & Refinery Co.

Some of those who attended the first conference may also have been familiar with the chemical air pollutants under regulation, in England, by the Alkali Act.

Most of those who attended the first conference were undoubtedly aware of the air pollutants from the nutro sources that were traditionally labeled "the offensive trades." The slaughterhouse, the rendering plant, the sewage-treatment plant, and the spice manufacturer, among others, were known to cause disturbance to neighbors through airborne molecular compounds.

It is interesting to note that eyes has been more readily accepted as being publicly, officially valid instruments in observations of air pollutants (and many other phenomena) than have the other human senses. This appears to be true whether one is concerned with direct visual observations using a visual comparison standard (the Ringelmann chart or painted surfaces or vegetation or metal or a distant hill), or whether one is concerned with indirect visual observations using the pointer or counter on an instrument meter. Color (where we are involved in the attributes of hue, brightness, and saturation) pattern (as in biological cell microscopy) and turbidity (in air or in liquids) are acceptable visual observations. They are considered more reliable when imitated through photochemical processes that are recorded in two dimensional photographic models.

The odor sense appears to many to be more readily accommodating; that is, it provides reduced recognition with increased time and intensity of exposure. It

is less readily accepted in formal discussions by air-pollution specialists. In private discussions and in actual practice, however, air-pollution specialists rely heavily on the odor sense.

The sense of touch and the sensations related to eye irritation, respiratory irritation, and reduced vital (lung) capacity have, similarly, been relied upon in private practice and scorned in public discussion.

During the past 50 years the development of instrumentation has proceeded at an accelerating pace in many technical fields to verify and extend the senses in time, spectrum, and intensity or sensitivity. The use of mathematical logic, aided by mechanized computers, has extended the ability of man to remember, to varify, and to develop relationships between his recorded observations of occurrences.

In a few isolated instances, and by a very few practitioners, there have been developed some special identification and measurement methods solely because of aiding community air-pollution problems. *Many more such methods appear to have been developed because of the special air-pollutant problems related to nuclear fission and fusion. Other new measurement developments arose from chemical warfare and long-range missile and submarine studies.*

It is interesting to note that the development of each identification and measurement technique appears to lead directly to new findings about the undesirable effects of air pollutants and the development of corollary control methods involving procedures and equipment.

Studies of the effects of air pollutants on human health, as reported in the technical literature now generally available to air-pollution specialists and laymen still read remarkably like the 1915 report of the Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals, a monumental study of a city's air pollution.

Newer studies are being made about the effects of air pollutants on tissue culture and on the "whole man" in relation to *long-range submarine operations and manned satellite-interplanetary flight plans.*

During the next 50 years one may speculate on many interesting developments.

Because of the improved flow of information between the applied scientist and engineers throughout the world, and between the practical governmental bodies of the world, one can expect more people in more communities to learn that *they can obtain clean air*, without risking economic disaster from industrial moveouts, *simply by insisting on it.* There is not, on this date to my knowledge a single community or larger area that has done all that is known technically or practically about clearing its atmosphere. Los Angeles is closest in most ways.

As the information becomes more widely disseminated as a result of better communication through the migration of people and the activities of regional, national, and international government agencies, industries, and voluntary associations like the Air Pollution Control Association, there can be expected to be extended the personal attitude now evident in a very few communities in the world that "Not only is excessive air pollution illegal, but it is unfashionable and frequently extravagantly expensive."

As part of the effective extension of communication, it is anticipated that a truly comprehensive systematizing of knowledge will develop to cover air pollutants, their sources, their transport, their transformation and interaction, their effects, and their technical and administrative control. Indexing, recording, storage, transmission, and retrieval of this knowledge can be expected to develop along the lines of modern documentation and modern indexing. The present handful of bibliographies, manuals, handbooks, and special libraries can thus be expected to be vastly supplemented, at relatively low cost once the design has been established and the backlog brought up to date.

(NOTE.—We are putting together, with local money (we were turned down by the Public Health Service for reasons hard to accept), a $38,000 microfilm library on air pollution, with quick access cross-indexing of the most modern type.)

The impact of a well-integrated air-pollution-control program upon a community has been observed to be significant in highlighting and therefore bringing about a clearing up of organized community operations. There is an immediate impact on planning and zoning, health, fire protection, sanitation services, public works, maintenance and engineering, and building inspection activities. Anything less than good coordination and adequacy in these government agencies tends to be exposed to a penetrating program of comprehensive air-pollu-

tion control. The fact that any defects show up, not only in a formal record of report, but in widely observable "skywriting," is the key to public requirements for basic corrective action where it is needed. In such instances excessive air pollution will increasingly be recognized as merely another symptom of other problems in community operations. Similar inadequacies in industrial operations also become exposed for management attention and correction.

As a result of the extensive and ingenious work of many scientists and technicians during the past 17 years in carrying out the brilliant concepts made by a few scientists during the past 50 years, much of it paid for by military and defense funds, *it is now scientifically possible to do almost anything one wishes in air pollution control—chemically or physically—if one will pay the price in money and inconvenience.*

The types of technical-control procedures and equipment that have been developed to stop the emission of radioactive gases, as well as dusts and droplets (visible, microscopic, and submicroscopic) from nuclear operations will be increasingly applied to the more common production processes, bulk power-producing equipment, and transportation equipment.

One may expect to see ratios of both capital and operating costs of the order of one-half of 1 percent to 5 or 10 percent for air-pollution control to the total involved. These ratios may well be as routinely scheduled (and debated) as are the United States Internal Revenue depreciation schedules.

The first findings of this International Geophysical Year may well, in retrospect 50 years from now, mark the end of an era of groping for atmospheric comfort in small neighborhoods and the start of an era that is equally concerned and capable of dealing with the practical and usable characteristics and preservation of local, regional, continental, terrestial, and planetary atmospheres. The concern over the black smogs of London, St. Louis, Liege, Pittsburgh, and Donora and the concern over the blue and mud-colored smogs of every metropolis in the world will undoubtedly be cleared away to be replaced by the concern over the electronically detectable, invisible clouds of radioactive gases and submicroscopic particles around the world and between the planets.

As the combustion economy is displaced by the nuclear-chemical economy, concern about soot and fly ash will undoubtedly be replaced by concern over strontium 90 and radioactive meteorites.

It is more difficult to foresee the changes in air pollution from the production of food, flowers, and lumber.

Color, shape, pattern, texture, and flavor have such importance to people that it is quite possible we will continue to reserve our factory-manufactured foods to breakfasts and desserts, leaving our lunches, dinners, and suppers to be composed largely on nonuniform field and greenhouse cultured fauna and flora. If this should be so, we may expect to continue to find many, though fewer and larger, agricultural operations carried on with a greater incidence of soil-skin coating and subsurface irrigation. The agricultural wastes may be expected to be mined more extensively rather than to continue to be vaporized, or leached out as they are at present in considerable degree.

Food preparation, whether industrial, commercial, or domestic, may similarly be improved for retention of flavor and development of color, pattern, and texture by quick heating and quick cooling. The quick heating, along with the clearing of surfaces by vacuum, ultrasonic, electrostatic, or detergent transfer, may be accompanied by the transport and disposal of wastes through underground hydraulic transport for subsequent centralized community treatment, salvage, and storage. Such storage, generally involved in sewage disposal now, may be mined far more intensively with new extractive and synthesizing techniques.

Personally directed transport that is now carried out in such a way that it is a major source of air pollutants and death by impact cannot be expected to be fully replaced by mass transport unless man's psyche—his emotional makeup—is rearranged in a fashion that contemparary man would consider dull and drab. Other forms of personally directed transport will use, more intensively, the soft lanes of the air instead of the unyielding lanes of the ground. Combustionless stored or remotely transmitted energy will undoubtedly displace the incomplete combustion power sources now used.

The processing of fresh chemicals and minerals and the secondary processing of used chemicals and used minerals can be expected to be carried out in larger, better engineered plants where instruments rather than men feed back the observations needed to vary the operating procedures. With such integrated operations, popularly called automation, the equipment requires such a high

degree of atmospheric cleanliness that the incentive to clean the exhaust air is extensive.

It is now not unusual to install an intake air-cleaning system costing $500,000 at a steel mill to protect 1 room of electrical gear against air pollutants produced by the mill itself and a few neighboring sources of air pollution. Similar intake air-cleaning systems being installed at metal painting, metal plating, large air compressors, and chemical and petroleum processing operations also indicate the need for cleaner atmospheres than ordinary man has considered necessary for his own well-being.

The world's population is increasing for many reasons. The concentration of population in smaller and larger cities, and the growth of tremendous metropolitan ranges will increase the air-pollution concentration potential of each community involved, requiring air-pollution control to a degree and over sources now considered unimportant by many air-pollution specialists. This factor may be illustrated as follows:

"A man stands in the center of a 10-acre island that is a field of sod. He strips 10 square feet of sod away from the earth around him. A 10-mile wind blows. The tops of the man's shoes become dusty.

"The man removes the sod from all 10 acres of his island. A 10-mile wind blows. The same amount and sizes of dust are emitted from each square foot of bare earth as before. But now he is completely enveloped by a choking cloud of dust.

"The air that now reaches the man is hundreds of feet farther from the point where it was clean, than before, because it has picked up dust from hundreds of feet of dust emission source.

"The man's visitor sitting in a rowboat at the downwind beach of the island, didn't notice the dust from the 10 square feet of bare earth, but he was even dustier than the islander after the whole island was bared."

As cities grow and touch each other for 20 miles, 50 miles, or 800 miles in the United States, as had happened in England's Black Belt years ago, the frequency of intensive air pollution and the intensity of infrequent air-pollution increases, even while the air pollutants from individual sources are reduced.

The planning needs of the future air-pollution control standards will undoubtedly be met by the development of mathematical models for each inhabited area of the country by the use of high-speed computers and large volume data storage equipment. Terrain factors and microclimate factors will establish patterns into which will be introduced air-pollutant load factors. Verification of the adequacy of the mathematical models will be increasingly developed by measurements of natural tracers, artificial tracers, as well as current air-pollutant loadings.

The load factor will include detailed quantity and identification of type, size, and potential detrimental effect of each emission of polluting materials from each source.

The land-use planning function and the air-pollution regulation planning function together, will be supplied with atmospheric load predictions just as telephone companies are provided with telephone circuit traffic predictions today.

The possibility that some air-pollutant concentrations may reach levels that are critically high over tremendous areas, even over the entire world, has already led to requests for international standards of emission to override local standards. The mathematical model work on some pollutants is undoubtedly well advanced already, according to security-cleared reports.

The increases in air-pollution effects that have already occurred have led to expanded study, especially research at national level, by governmental agencies, industrial groups, and semipublic organizations.

The results of these studies, as they are disseminated, will encourage the open demand by citizens in more areas for cleaner air as the air becomes increasingly polluted because more people are living and working closer together. The fact that many of these citizens have managerial and technical responsibility for the larger private and public sources of air pollutants will not be a deterrent. Instead their dual status will assist in the development of technical and administrative methods of reducing the emission of air pollutants from the smaller public and privately controlled sources.

Design and operational performance commercial standards that were adequate for national and individual economy will be revised for air-pollution reasons. Exhaust emission standards for domestic oil-burning furnaces may be expected to be modified in the foreseeable future in the same way that domestic incinerator

standards are being modified now even in well-ventilated cities. The poorly ventilated cities and those covering tremendous areas may well extend their controls to smaller and smaller individual operations while, at the same time, they establish more rigid requirements for the larger operations.

The older fears and threats of industrial move-outs, when air-pollutant controls were planned have already proved themselves insignificant. As more citizens and their elected representatives learn that bad-mannered industries drive out and keep out well-mannered industries, and as more of the traditionally bad-mannered industries have learned that they can become better citizens as they clean up their air pollutants at a small percentage of their capital costs and operating costs, the administration of air pollution control programs will probably become increasingly regional and increasingly technical in order that the control be more precise and more equitable.

The higher costs of cleaning gases and submicroscopic dusts and droplets will require more critical determinations of effects, causes, and emissions from sources. The trained eye and the educated, experienced mind will be supported by more instruments in the field and in the laboratory.

The fact that gases and submicroscopic particles travel greater distances than do the larger dusts and droplets that fall out near the source will lead, increasingly, to regional air pollution control administration.

Public support for such loss of local sovereignty will increase because of the reports of formal studies and because increased personal mobility by ground transport and by air transport will permit more of them to observe transboundary air-pollutant effects with their own senses.

The forms that air pollution control standards and regulations will take are subject to speculation. As it becomes more widely recognized that many thousands of small sources may add, in total, as much as a few large sources to an areawide air-pollution effect, there may develop patterns of conflict similar to those surrounding taxation, with full or partial exemptions, open or hidden subsidies, and well-understood variations based on ability to pay for control, technical ability to control, and administrative ease of control.

It can be expected that the interactions of technical factors relating to air pollution will be easier to trace and define than the interactions of taxation economics. Some specific air-pollution problems may possibly exist in some areas under some weather conditions even after doing everything that is technically feasible. For other air-pollutant situations it can be expected that the exact form that legal regulations will take, although based on technical fact, will be finally determined by the political judgment of those with legislative responsibility for the area of jurisdiction.

Present voluntary standards and Government regulations follow many patterns:

Limits on the concentration of a pollutant in such terms as pounds of pollutant per pound of exhaust gas emitted.

Limits on the rate of emission of a pollutant per unit time per point of emission, in such terms as pounds of pollutant per hour per stack.

Limits on the rate of emission of a pollutant per unit weight of material processed, in such terms as pounds of pollutant per pound of material processed.

Limits on the demonstrable effect of the pollutant on visibility at the point of emission, in such terms as Ringelmann shade or equivalent capacity.

Limits on the demonstrable effect of the pollutant on people, the things they own, or the things they like to do, translatable, usually, to words of judgment but, in some instances, to specific number measurements of pounds of fallout per unit time per unit area or the resultant concentration of a pollutant in air or in vegetation or in other material at the receiving point.

Other standards or regulations specify the design of the method or equipment involved or establish a ratio of cleaned to uncleaned pollutants in the exhaust stream.

As more studies are reported publicly and more individuals and groups publish their experiences and as more of those in this field formulate and disseminate their concepts more systematically and definitively than has been done in the past, there will develop a system of standards and regulations that arise out of the logic of the situations with the few historic "borrowings" of standards well recognized for what they are—expedients that accomplish reductions in air pollution.

It is almost mandatory in such a discussion as this to make predictions about the technical advances that can be expected in the next 50 years.

In spite of industrial and military security restrictions on news of many technical developments, *it is safe to say that technically available devices and methods can produce omission streams that are cleaner than is the atmosphere itself.* It is also safe to say that for all new processes the same degree of exhaust cleanliness can be obtained technically.

It is proper to state that the new developments in social organization and, especially, communication will be so great during the next 50 years that it is not at all possible to predict the degree to which the technical feasibilities in air-pollution control will be turned into legal requirements by communities.

In closing it is necessary to state that:

There is an increasing compaction of people and industries.

There is an increasing output of air pollutants in the form of gases and submicroscopic dusts and droplets.

There is an increasing output of chemically and biologically active types of air pollutants.

There is an increasing need for persons in the many technical groups concerned with air pollutants and their effects to so organize that they will meet face to face and through reports in the literature with a maximum of free exchange of both "giant step" concepts and "baby step" data.

There is an increasing need for the United States Government to take a leadership position within the United States and in the world in which its economic status is so high, by cleaning up the air pollution from the properties, buildings, equipment, fixed and mobile, and the processes that it owns and operates, and reporting fully in the technical literature as to its experiences for the guidance of others now and in the future. There is no question about the technical, financial, or organizational propriety in this specific proposal now, and because so many of the new developments in high energy fuels, including radioactive ones, are under national security restrictions, as the backlog of conventional problems are cleaned up, the lag between old and new problems will be narrowed so that air-pollution problems will not be treated at different technical levels because they are in different security compartments.

Something New in the Air

(Air pollution and its control in the bay area)

By Benjamin Linsky, air pollution control officer, Bay Area Air Pollution Control District, San Francisco, Calif.

As citizens of the bay area and as engineer-scientists who are not air-pollution specialists, it is important to recognize that something new has entered the community atmosphere in this area.

There is smog—not yet critical to most people, but enough to furnish warning signs to those who are more discerning.

And there is a new smog-control agency—one that is unique and provides a potentially useful example of areawide government service for areawide problems.

What is smog?

Smog means many different things in many parts of the world. Its general meaning is: "Excessive concentrations of air pollutants recognized by people because of the undesirable effects on people, the things people own, and the things people like to do."

The effects of smog will be classified as follows, with the understanding that only some of these effects are considered significant in the bay rea:

1. Visibility interference, in the absence of fog.
2. Overhead sky darkening.
3. Soiling of surfaces, light or dark.
4. Annoyance to people's senses; interference with sensory comfort.
5. Damage to vegetation.
6. Other property damage.
7. Interference with production or services.
8. Damage to health.

The effects of smog will be broadly divided into two groupings:

Localized effects, as from a single point source, or group of sources, on nearby areas.

Areawide effects extending more than a mile or two from a point source or group of sources.

The physical nature of air pollutants will be classified broadly into the following five categories:

1. Large dust.
2. Microscopic dust.
3. Droplets.
4. Microscopic droplets.
5. Gases.

The first four are generally termed "particulates." Further, microscopic dust and droplets are generally termed "aerosols."

Air pollutants may be found in one physical form at the point where they enter the atmosphere, but may be found in some other form afterwards as physical, chemical, and photochemical changes and interactions occur.

The physical classifications make it easier to distinguish between those pollutants that may cause areawide effects (only microscopic dust, microscopic droplets, and gases) and those that, generally, cannot contribute to areawide effects (large dust and droplets).

The above has described the physical nature of air pollutants and the various effects of excessive air pollution—both local and areawide.

Where do these pollutants come from? And what can be done about them?

Manmade haze from microscopic dust and droplets comes largely from metallurgcial, chemical, petroleum, food-processing industries, heavy oil burning powerplants, large dump fires, backyard incineration, automotive exhausts, and earth moving.

Eye irritation seems to come mainly from unburned hydrocarbons (petroleum product vapors) from refineries, storage tanks, automobiles, buses and trucks, food processing, incomplete burning of fuel, rubbish and combustibles on scrap metal, and evaporated solvents used in metal painting and cleaning. When the sunlight works on these hydrocarbons, there is a chemical reaction that turns some of them into eye irritants.

The same kinds of unburned gases, and some of the dusts and droplets, also cause damage to vegetation.

The above refer to areawide effects caused by several hundred large sources and several hundred thousand small sources. The exact percentages of each can be determined—and the plan is to find out, by studies—but it is not really necessary to wait for the surveys to start abating pollutants known to be significant in type and quantity.

In addition, there are a large number of local-effect air-pollution situations that cause soiling, damage, and annoyance.

What can be done about them?

There are good, practical answers for almost all of the sources of air pollution now. While the known things are being done, it is expected that the other practical answers needed will become available—such as the means of controlling automobile gasoline evaporations and gases emitted from automobile exhausts, and microscopic droplets.

In the district's program of informing people and adopting the community's standards into regulations for cooperative compliance or enforcement, the greatest emphasis will be placed on the well-recognized desire of bay area people to preserve and restore their beautiful view and brisk, pleasant atmosphere.

Almost without exception, the changes in equipment and practices to abate air pollution will cost money and may cause some inconvenience to the owners and the customers of the owners of equipment and processes that cause air pollution.

Obviously, it is planned to start with the large sources. This will cost every resident more in the price of the goods and services he buys.

Also, almost without exception, the changes in equipment and practice will take calculable time to accomplish after a regulation is enacted. The necessary time for design, procurement, and installation of control equipment or alternate service begins to run when the property owner (public or private) personally decides to act. When the decision is made before or immediately after the enactment of a district rule, and the subsequent abatement steps are taken promptly, the result can and will be recognized as being done in a cooperative spirit.

It is noteworthy that many such decisions have already been made and many subsequent abatement steps have already been taken with results that are evident to specialists and that will, to the maximum degree, be publicly described, giving credit for the cooperative spirit that has been demonstrated.

What agency is responsible for leading this program?

The bay area air pollution control district was established by State law, chapter 1797, Statutes of 1955. It is the first multicounty air pollution control agency in the United States.

It is a level of government between the county and the State.

It is one of the first areawide agencies that is governed entirely by people who are all elected locally for general local government service, and who had then been selected by their elected peers to represent them for service in an areawide governmental agency.

It exercises operating and taxing authority.

Each of the six directors is a county supervisor (one from each county in the district), selected by his own board of county supervisors to represent them in the district board.

Each of the other six directors is a city mayor or councilman (one from each county) selected by a committee of all the mayors of all the cities in each county, who meet on a given day and choose one of themselves or one of their councilmen to represent them.

This board, consisting of 12 directors, appoints a district control officer and an executive secretary.

There is also provided an advisory council to advise and consult with the board and the control officer. The council consists of the chairman of the board, who serves as an ex officio member, and 20 members who preferably are skilled and experienced in the field of air pollution, including at least one representative of colleges or universities in the State and at least one representative of each of the following groups within the district: health agencies, agriculture, industry, community planning, transportation, registered professional engineers, general contractors, architects, and organized labor.

The district establishes its own budget, supplied by taxes which are collected by each county for the district.

The district's budget amount is assessed against the counties in two ways. One-half is spread in proportion to the population distribution. The second half is spread in proportion to the total assessed valuation distribution.

The tax rate is limited by law to 1 cent per $100. (This sets a current ceiling of about $365,000 on the district's budget.)

Rules and regulations for the control of air pollution can be adopted by the district's board of directors only after public hearings that have been well advertised. This provides the means for assuring that all pertinent information and viewpoints will be brought to the board's attention before the adoption of a rule, and precludes hasty, ill-advised rulemaking. The owners of equipment can be required to furnish the district with valid reports about their own air pollution emissions.

The law provides the district with machinery designed to encourage maximum compliance abatement of air pollution by persuasion, with court enforcement available only after review by a hearing board that consists of one mechanical or chemical engineer, one attorney, and one other, appointed for long terms by the board of directors.

Court enforcement is by injunctive proceedings. The violation of an injunction places the violator in contempt of court and subject to the court's penalties. (This procedure, while slower than the misdemeanor type of law enforcement, can be powerful and comprehensive.)

CITY OF CHICAGO,
DEPARTMENT OF AIR POLLUTION CONTROL,
Chicago, Ill., November 19, 1957.

Mr. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee,
House of Representatives, Washington, D. C.

DEAR MR. FOUNTAIN: Please excuse the long delay in replying to your letter of October 21, 1957.

I shall be happy to describe Chicago's air-pollution problem to you, and to make recommendations to you along the lines you suggest. Metropolitan Chicago is probably the leading fuel consumption area in the world today—burning annually in excess of 2 billion gallons of fuel oil, 2 billion gallons of gasoline, 2 billion therms of natural gas and 40 million tons of soft coal. To help combat this tremendous source of air pollution, this department conducts approximately

40,000 annual inspections of large fuel-burning installations. With constant vigilance the smoke problem has not attained major proportions.

In the case of chemical contaminants, however, we do have some serious problems. To combat this, the department has been expanded to include a chemist and a physicist, and the city ordinances are being revised to give us the authority to regulate pollutants other than smoke.

Our worst headache is caused by the ring of suburban communities surrounding Chicago, where fuel burning remains completely unsupervised, and where we lack jurisdiction. The answer here must lie in a new metropolitan authority such as that established in Los Angeles. Chicago's heavy industry area extends into Indiana, so that cooperation between the States would be most helpful. This area might be one where the Federal Government could take a hand.

The United States Public Health Service has done a wonderful job in this field by furnishing technical assistance and by offering training courses at the Taft Sanitary Engineering Center, which can be found nowhere else. I would recommend that more money be allotted this vital activity, so that better equipment might be loaned to local government agencies, and so that teams of experts could be sent to various communities to assist in establishing more efficient agencies.

The USPHS should standardize sampling procedures, recording methods, and data interpretation. It should also establish maximum permissible concentrations of atmospheric pollutants similar to industrial health limits.

If we can be of any further assistance to you, please feel free to contact us again.

Yours truly,

THOMAS H. CAREY, *Director.*

CITY OF CINCINNATI,
DEPARTMENT OF SAFETY, AIR POLLUTION CONTROL AND HEATING INSPECTION,
Cincinnati, Ohio, October 25, 1957.

Hon. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee,
House of Representatives, Washington, D. C.

DEAR CONGRESSMAN FOUNTAIN: Your letter of October 21 has just been received and I will hasten to answer it in order to meet the October 26 deadline you set.

The air-pollution problems in our area are typical of those found in an urban industrial community. There is a large demand for the burning of solid and liquid fuels to heat occupied space and generate power and steam for industrial processes. There is a wide range of industrial operations wherein waste products discharged with waste gases into the atmosphere in varying degrees depending upon the cleaning efficiency of air pollution control equipment. There are nearly a million people who live and work here burning thousands of gallons of gasoline a day and generating a half-million tons of waste which must be disposed of annually.

The problems in our area are largely one of economic loss due to the soiling of buildings and furnishings, interior and exterior, the damage to property by corrosion and erosion, the effect on the vegetation of the area, and the cost of cleaning the outdoor air before it can be used in air-conditioning systems and in the most exacting industrial operations. We measure our problem also in the annoyance and discomfort our citizens suffer from localized sources of excessive pollution of odors, dusts, grit, and fumes. People of this area are particularly annoyed by the fumes from diesel bus exhaust. We are also cognizant of the potential effect of air pollution on the general health of the community.

With reference to general area pollution, we frequently experience temperature inversions which cause a buildup of pollution under the inversion layer mixing at times with fog causing an excessively high soiling condition. We are carefully watching the effect of the hydrocarbon exhaust from automotive engines and have on occasion observed the smog reaction resulting from the presence of excessive hydrocarbons, oxides of nitrogen, and sunlight. The last such incident was witnessed in October of 1956.

The program of the bureau of air pollution control is found in the attached 1956 annual report.

With regard to our opinion of the Federal air-pollution program, we believe that the overall policy is well founded. Since our day-to-day interest lies in the engineering phase of air pollution, we have a desire for more emphasis on engineering research. We do not discount the need for medical research as we know

that there is need for work in this area. We feel that medical research will be long-range programs. We feel that the biggest payoff will be in the engineering research phases, particularly in the matter of determining the characteristics of air pollution, how it behaves, where it comes from, and how it is dissipated. The cause-and-effect relationships need careful study. We feel that research on the control of specific pollutants is definitely needed.

Our principal criticism of the Federal program would be in the channels of communications. Air-pollution control departments in many communities are not in health agencies. Emphasis on channels of communication has been through State health agencies; as a result local officials who are not in health agencies are at a disadvantage.

With reference to the matter of obtaining increased efficiency and economy in the administration of the Federal program, we feel that the general plan of the Public Health Service in maintaining a top-management group in Washington for the overall control of the program and the contacts with other Federal agencies and then establishing the engineering, research, and field service activities outside Washington has definite merit. Their choice of Cincinnati has been advantageous. The area about Cincinnati offers an excellent opportunity for research in air pollution. In addition, the city of Cincinnati is close to the heart of the population center of the Nation and is easily reached from all areas. We feel that the placing of the community air pollution program in quarters serving the water pollution control program and other environmental research activities is a wise one.

In commenting on the third point regarding more effective approach at the Federal level to the problem of air pollution, I will state that this whole matter of air pollution research is in the early stages of development and must be guided as factual information comes to light. I feel that the National Advisory Committee on Community Air Pollution, established by the Surgeon General, will be helpful in guiding the Federal program. I would expect that the United States Public Health Service will utilize the committee for the purpose of constructive criticism and make full use of their recommendations.

This is a hastily written commentary on a very broad subject. If more time was available, more detailed comment would be made.

In summary, I would say that a Federal air-pollution research is a valuable service to the local communities in dealing with this complex problem of reducing air pollution.

Yours very truly,

CHAS. W. GRUBER,
Air Pollution Control and Heating Engineer.

BUREAU OF AIR POLLUTION CONTROL AND HEATING INSPECTION ACTIVITIES FOR 1956

Report prepared by Charles W. Gruber, air pollution control and heating engineer

FOREWORD

For the past several years we have been calling attention to a specific problem facing our community in providing cleaner air—namely, what should be done to encourage communities outside the city of Cincinnati, but within our air-drainage pattern, to join forces in a coordinated attack on dirt, dust, and discomfort from polluted outdoor air. Obviously, a community of 500,000 people, surrounded by another 500,000, cannot go at the job alone and attain the best results. It is a real mark of progress to include in this report the outline of a plan for a coordinated air-pollution program for this metropolitan area based on voluntary participation by our neighbors.

This plan has been offered to 15 communities, and informal replies are that the majority will participate. It remains now to work out the details and set the program in motion; 1957 will be the year of decision in the activation of a metropolitan air pollution control district.

We look forward to including in this report the results of the intense safety campaign that has been carried on for the past several years to reduce accidents from carbon monoxide poisoning from the use of small heating and water-heating equipment. It appears that 1956 has been the turning point in stemming the rise of accidents and deaths. We hope that the downward trend will be continued.

In the overall, this report will be difficult to write. Its main purpose is to provide a statistical record of activity of our bureau in promoting cleaner air safety

for the people of Cincinnati. Yet, we know of the great interest of many people in this report, so we will attempt to soften some of the hard technical facts by including a summary of activities at the beginning and statements of accomplishment in each of the sections of this report.

CHAS. W. GRUBER.

PROGRAM OF THE BUREAU OF AIR POLLUTION CONTROL AND HEATING INSPECTION

The abatement of smoke and other air pollution to the end that Cincinnati will become a brighter, better, more healthful place in which to live is one of the two major objectives of the bureau of air-pollution control and heating inspection. The other major objective is to obtain for the people of Cincinnati the ultimate of safety from fire, explosion, and health hazards in fuel-burning and heating-equipment installations.

The following is the program conducted by the bureau of air-pollution control and heating inspection to accomplish these objectives:

1. Engineering supervision over the installation of heating, fuel-burning, and air-pollution prevention equipment and appurtenances by prior approval of plans and specifications and issuing permits, and subsequent field inspection to the end that air pollution from the operation of said equipment is reduced to a minimum, and the highest degree of safety from fire, explosion, and health hazards from such equipment is obtained.

2. Control of atmospheric pollution from smoke, chimney dust (fly ash), incinerator odors and fumes and noxious gases escaping to the atmosphere, by making regular observations of chimneys and recording violations; making investigations of causes and making recommendations for correction, and fixing personal responsibility for smoke violations; by prosecution of offenders after investigation of facts and giving prior warnings; by investigating all manner of citizen complaints regarding air pollution from any source, and taking appropriate action.

3. Periodic annual inspection of all solid or liquid fuel-burning equipment installed in the city of Cincinnati, subject to annual inspection, for the purpose of determining whether or not such equipment can be operated within the requirements of the smoke ordinance, and for the purpose of issuing or refusing a certificate of operation.

4. Field inspection of gas space heaters and other operating gas equipment to improve the safety of such equipment by requiring compliance with code regulations when improper or hazardous installations are brought to the attention of the bureau of air-pollution control and heating inspection by referrals from other city inspection departments or by direct calls from the public for inspection service.

5. Regulations of the importation, sale, use, or consumption of solid fuel, including the licensing of dealers in solid fuel.

6. Conduct a research program to increase knowledge of the general nature and behavior of the air pollution over Cincinnati.

7. Maintain good public relations to secure cooperation of the public in reducing atmospheric pollution and otherwise complying with ordinance regulations pertaining to heating and fuel-burning equipment.

SUMMARY REPORT—1956 HIGHLIGHTS OF PROGRESS

Air pollution enforcement effort

There was 95 percent less visible smoke emitted from Cincinnati's chimneys as compared with 1946, the year before the present air-pollution ordinance was adopted.

A frontal attack was made this year on smoke from salvage operation. All open burning of old automobile bodies for scrap preparation was discontinued on order from this bureau.

The use of a mobile radiotelephone was inaugurated for obtaining better enforcement action. Immediate contact from an observation point can now be made with an offending plant, to stop a smoke violation before it becomes serious.

After a training course in the police academy, all of the inspectors of the bureau were vested with special police powers for improved enforcement authority.

A major step forward in cleaner air was made in October when the Norfolk & Western Railway converted their entire Cincinnati operation to diesel locomotives. The rail activity in Cincinnati is now more than 70 percent dieselized.

The problem of smoke from steam-driven river boats has been one of long standing and a difficult one to find the solution. When operating in the river they are in Kentucky waters, but Cincinnati feels the force of the smoke from the boats because of the prevailing southwesteerly winds. More than 30 percent of the smoke violations written during the year were charged against river steamers. Here again we have an example of the interchange of air pollution between neighboring political jurisdictions.

While visible smoke has been greatly reduced, the complaints from other air pollutants—namely, odors, dusts, fumes, and gases—continue at a high level. This bureau is increasing its activity to eliminate the sources of all air contaminants.

Air pollution from automotive engine exhaust was the subject of a thorough study by a committee appointed by the city manager. In April, the committee report containing five specific recommendations for dealing with this important air-pollution problem was submitted to the city manager.

The pollution of the atmosphere from foul odors is a particularly difficult technical and enforcement problem. In order to better understand the nature of odor problems and means of eliminating odors, a metropolitan Cincinnati conference on air-pollution control devoted entirely to the subject of odor control was sponsored during Cleaner Air Week.

New legislation

After an exhaustive study of the important chimney regulations, the entire chimney requirements were revised. The new regulations recognize the trend in space heating equipment toward automatic firing. The air-pollution control and heating engineer served as chairman of the chimney code revision committee.

Among other important legislative actions is found the ordinance to extend to the fire and health departments, the authority to seal out of service gas heating and water heating equipment and the ordinance amending the requirements for fire-room enclosures for gas-fired furnaces and unit heaters.

Supervision over newly installed equipment

More than 5,000 installations of heating and fuel burning equipment valued at more than $5 million were subject to engineering review for compliance with air-pollution abatement regulations and the safety requirements of the code. This equipment was field inspected to see that the installation was made in accordance with the provisions of approval. Installation permits were refused in many applications until adequate air pollution control equipment was included.

Gas safety inspection program

While continuing to carry out our primary responsibilities, this bureau has been assigned the tremendous burden of organizing and directing the city's "war against the silent killer." It has been estimated that in Cincinnati, there are more than 300,000 units of heating and water heating equipment that can be a source of CO fumes.

The city's program has drawn national attention by featured articles in such national magazines as Domestic Engineering, APCA News, American City, Safety Maintenance and Productions, Fire Engineering, and others.

The attack against this hazard was stepped up on two fronts—inspection and education. The air-pollution and heating inspectors made 2,100 heater inspections during the year, resulting in 1,000 defects being repaired or removed. One hundred and two hazardous or defective heaters and water heaters were sealed before they became the cause of a fatal accident.

A special inspection task force made up of inspectors from housing inspection division, the fire department, and the health department, inspected nearly 5,500 heaters of which 27 percent were defective and corrected. During this special program, 1,003 silent killers were repaired or removed; 178 were sealed before they could kill.

CO fumes accidents investigated indicate that 75 percent of such accidents could have been prevented by proper installation of heaters to a good clean chimney.

The first annual Check Your Chimney Week was organized with lightning speed upon the suggestion of the air pollution control and heating engineer. This bureau, as well as the fire department, health department and housing inspection division joined with the Greater Cincinnati Safety Council, the Cincinnati schools, retail grocers, and the Cincinnati Gas & Electric Co., to educate the people of this area to check their chimney—150,000 messages were prepared by the Cincinnati Gas & Electric Co. and distributed through the schools and retail grocers. The first Check Your Chimney Week was in January. For the 1956–57 heating season, a similar campaign was held the week of December 3.

The overall results of the city's battle against the "Silent Killer" are encouraging. For the first time in 4 years, there has been a significant downward trend in number of confirmed carbon-monoxide accidents—21 in 1956 as compared with an average of 36 in each of the previous 3 years.

Air-pollution measurements

Cincinnati had 1.4 percent less dust fall than last year, but the soil index at the downtown station was noticeably higher. In the residential area, the soil index was only slightly higher. This indicates that the meteorological conditions which trap the air contaminants in the basin area under the inversion layer, occurred more frequently and lasted longer than last year.

Approximately 40,000 individual measurements of air pollution and weather factors were made to determine the extent and character of the contamination of the air over our city.

Public information

Public information in the form of special events, public meetings, talks and writings is very important in creating a spirit of willing acceptance and cooperation with the program of the Bureau. In addition to Check Your Chimney Week and the Metropolitan Odor Conference already mentioned, the Cleaner Air Week event was sponsored.

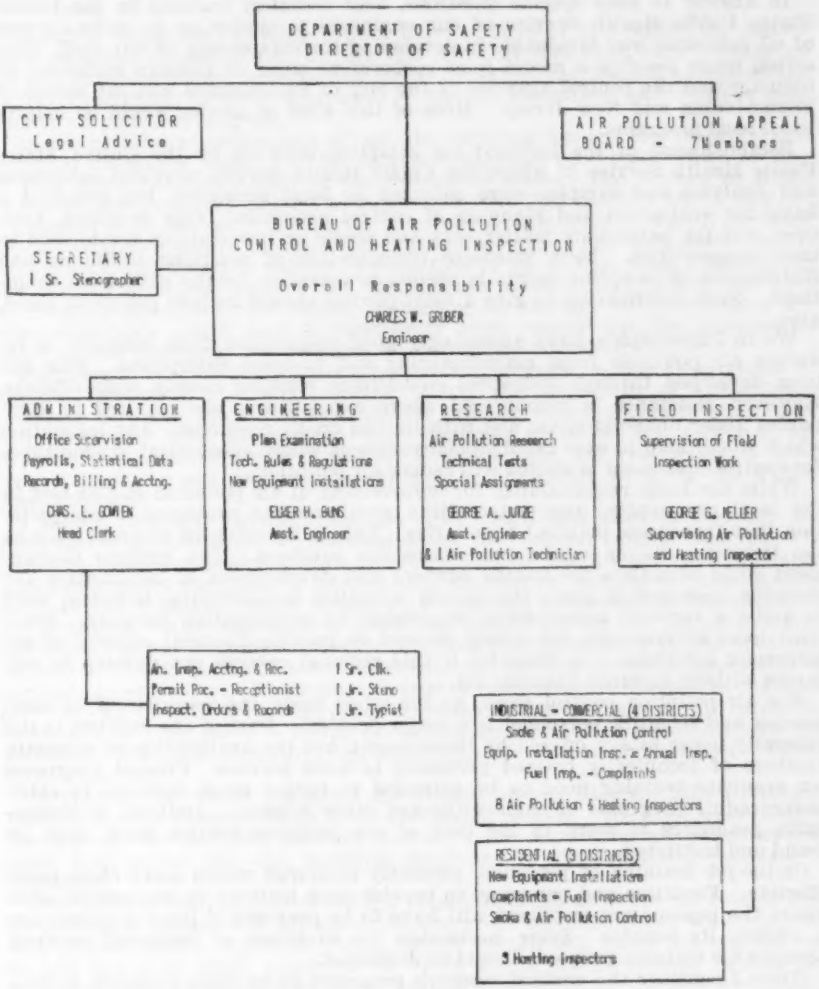
Numerous talks and technical writings formed a vital part of this public education effort. The support afforded by local press, radio and TV stations is appreciated as a valuable aid in accomplishing our objectives.

From all parts of the country and from such distances as England and South Africa, visitors were received for the purpose of studying our cleaner air and safety program. Such national and international attention to the work we are doing is gratifying and might be considered an indication that our program is a well founded service to the people of Cincinnati.

BUREAU OF AIR POLLUTION CONTROL AND HEATING INSPECTION

CITY OF CINCINNATI

ORGANIZATION CHART



CITY OF PHILADELPHIA,
DEPARTMENT OF PUBLIC HEALTH,
DIVISION OF AIR POLLUTION CONTROL AND ENVIRONMENTAL SANITATION,
Philadelphia, Pa., October 24, 1957.

Hon. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee,
Committee on Government Operations,
House of Representatives, Washington, D. C.

DEAR MR. FOUNTAIN: It is a pleasure to respond to your request for opinions concerning Federal air pollution control legislation. It is particularly gratifying that the committee is seeking advice from local authorities who directly meet and cope with such problems.

To meet your time requirements, this letter expresses only my considered personal opinions which result from professional experience at the local level. Since conditions did not permit me to confer with superiors this letter does not necessarily represent the official position of the city of Philadelphia or its department of public health. Nevertheless, I am not aware of any inconsistencies.

In answer to your specific questions, field technical training by the United States Public Health Service of our engineers to enable us to make surveys of oil refineries was invaluable in developing the competency of our staff. This action made possible a model joint cooperative study of refinery emissions by industry and the control agencies of the city of Philadelphia and the States of Pennsylvania and New Jersey. More of this kind of service would be helpful to all local programs.

Establishment of the national air sampling network by the United States Public Health Service in which the Public Health Service provided equipment and analyses and samples were collected by local personnel, has provided a basis for evaluation and planning of control activities. This sampling, however, was for particulate matter only and single or few stations established in most communities. More intensive investigation of sampling technique and distribution of sampling points is needed to correlate results with local conditions. Such information to give a total picture should include pollutant gases, also.

We in Philadelphia have exceedingly good cooperation from industry in reducing air pollution from manufacturing and business enterprises. This has been developed through industrial committees working closely with officials. However, resistance is encountered where expenditures are required by companies under financial stress and with limited credit resources. Any legislation which would help to ease the financial problems where substantial expenditures for control equipment is needed will reduce air pollution.

While the basic responsibility for enforcement of air pollution should rest in the local community, any metropolitan area presents problems of air pollution that transgress political boundaries. This is accentuated in areas such as the Delaware Valley where two States are involved. The Federal Government could stimulate factfinding surveys and development of information for planning coordinated areawide control activities by providing technical staff to assist a regional organization established by participating agencies. Since most local governments are sorely pressed to provide financial support of enforcement activities it is doubtful if this regional concept can develop to any extent without external financial aid.

For air pollution control work, as for other fields, the recruitment of engineering and scientific personnel is a major problem. Part of the problem is the generally lower salary offered by Government, but the availability of adequate numbers of technically trained personnel is more serious. Present programs for graduate training need to be extended to induce more students to enter undergradute programs of engineering and other sciences. Methods of encouraging graduates to work in the field of air pollution control must, also, be found and instituted.

On-the-job training of personnel presently employed would make them more effective. Facilities and personnel to provide such training in the general area where the persons are employed will have to be provided if large numbers are to receive its benefits. Some mechanism for exchange of personnel between agencies for training purposes should be developed.

While I consider the medical research programs to be quite valuable, it does not appear that the distribution of Federal funds for engineering and applied research has been adequate. These latter projects are essential if local agencies are to have the means of establishing criteria for evaluation, planning, and implementation of adequate and comprehensive control programs.

If I can be of further assistance I am happy to be of service.

Sincerely yours,

P. W. PURDOM, *Director.*

DEPARTMENT OF SMOKE REGULATION,
COUNTY OF MILWAUKEE,
Milwaukee, Wis., October 28, 1957.

Mr. L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D. C.

DEAR MR. FOUNTAIN: In reply to your letter of October 21 I regard the matter as of sufficient importance to dictate this letter at this time, thus holding up my departure for a seminar being held in the Robert A. Taft Sanitary Engineering Center, Cincinnati, by the Department of Health, Education, and Welfare community air pollution program.

In general the establishment of an air pollution agency for research and technical assistance began with the intergovernmental conference called in May of 1950 under the sponsorship of the Bureau of Mines. The Bureau of Mines of course had been very helpful in connection with fuel matters but it was not considered to be necessary for the Bureau to be greatly concerned with anything beyond establishment of technical standards which they had been instrumental in adopting and securing national recognition of up to that time. Specifically the Bureau of Mines adopted the Ringelmann smoke chart, which has been used widely throughout the country as well as in Europe. Of course there are other standards which may be technically more precise but the Ringelmann chart is still preferred for practical operations in the field.

The advent of establishing the air-pollution program in the Department of Health, Education, and Welfare was largely the outgrowth of air-pollution problems in areas similar to Los Angeles County, where problems other than had previously been encountered were requiring scientific and technical approaches comparatively new to the air pollution field, but resembling in some respect methods and instruments utilized in analytical work in the Public Health Service.

I believe that it is essential that the ideas which have been carried into air pollution work recently be divorced from the popular notion that all air pollution hinges on health hazard factors. Much of the air pollution is simply a nuisance which the public is interested in eliminating because of cleaning costs involved and a general desire of modern civilization to accomplish cleanliness if not godliness. It is important to know that health officers are not particularly efficient or useful in connection with pollution control matters in the open air. Industrial health hazards inside of factories and the like are quite susceptible of accurate measurement. The reserve is true of contaminants released in the open air. Therefore until a concentration of contaminants in the open air threatens to become as great as it is inside of certain manufacturing establishments the maximum allowable concentration established for industrial purposes means little or nothing.

In general we would commend the Department of Health, Education, and Welfare for the valuable work it has performed to date. We are cooperating in the national air sampling network section of the community air pollution program and believe that the material developed by this sampling program is important.

The training section is also doing a magnificent job although we believe that meteorological aspects of air pollution are given an importance which applies only to local areas. As Mark Twain stated, we can talk about the weather but no one has done much about it. In other words, meteorological factors are usually a mass of generalities which hardly warrant all of the field experimentation which has been devoted to this field.

The work done in toxicology and industrial health is certainly an asset but it is essential that from this work should come permissible maximum allowable concentration data applicable to pollution of the open air.

A primary criticism is that the Federal program, like many other governmental programs, is not too adequately coordinated with other departments or agencies of the Federal Government. As an example, the Veterans' Administration may well build a most obsolete type of steam plant or powerplant or even refuse

burning incinerator without any coordination or control or even advice from the air pollution program section of the Public Health Service. The same is true insofar as the General Services Administration is concerned. There are undoubtedly other governmental departments such as the Army and Navy which could well profit from practical applications which should flow from the community air pollution program section of the Department of Health, Education, and Welfare.

With regard to your item No. 2, we believe that our knowledge of the inner workings of the Federal program hardly make us qualified commentators with respect to matters of increased efficiency and economy. We should think that the accounting and auditing sections of the Federal Government might well provide that information.

Under item No. 3 our suggestions for more effective approach at the Federal level to the problem of air pollution is more or less answered in one of the above paragraphs. We think the practical applications should flow into and be coordinated with activities of other Federal departments, agencies, and administrations. It would also be a material aid to States, counties, and other municipalities to have uniform standards of performance insofar as the emission of dust, smoke, and various other contaminants is concerned established so that the overall minimum standard would be established on a nationwide basis. This, however, does not eliminate the probability that critical areas would find it necessary to adopt much more restrictive standards in order to obtain reasonably good freedom from air-pollution contaminants. The classic example of that, of course, is that the emission of contaminants in Los Angeles County simply must be held down to very small fractions of what can be permitted in areas such as Milwaukee County where wind and topographical conditions are much more favorable.

Going back to the second paragraph of your letter we would say that the principal benefit that we are receiving from the Federal program is in line with the dissemination of information which is falling from the Federal program. The local problems of administration and enforcement, of course, are strictly our own and must be solved on a continuing basis. We believe, however, that the Federal program should be designed to operate where air contaminants are carried over State lines or international boundaries. This would envisage the expansion of the Federal program to include matters of law enforcement.

I trust that the above comments will be of some value to you and it is my hope also that they possess some elements of being constructive.

Sincerely yours,

J. E. BROWN,
Air Pollution Control Engineer.

EXHIBIT C. STATEMENT OF S. SMITH GRISWOLD, AIR POLLUTION CONTROL OFFICER, LOS ANGELES COUNTY AIR POLLUTION CONTROL DISTRICT

EVALUATION OF FEDERAL AIR POLLUTION RESEARCH AND ASSISTANCE PROGRAM

By S. Smith Griswold, air pollution control officer, Los Angeles County Air Pollution Control District

Since the inauguration of the Federal air pollution research and assistance program in 1955, the Los Angeles County Air Pollution Control District has been a careful observer of its progress. To a substantial degree, the enactment of the bill that created the program represented the culmination of legislative action precipitated by congressional representatives from the State of California—representatives who were concerned over the ravages of air pollution on Los Angeles County and in other parts of the State.

Although the county of Los Angeles has pioneered in the fight against air pollution, the formidable technical obstacles which have prevented a solution to the Los Angeles problem have provided the base for our interest in a concerted national attack on this problem. Since 1947 the county of Los Angeles has administered the most aggressive air pollution control program in the history of the Nation. In the interests of that program, more than $14,889,361 had been expended by the taxpayers of Los Angeles County by June 30, 1958. In addition to these expenditures in support of governmental control activities,

more than $68,997,900 had been spent by private industry for the construction of air pollution control devices.

A countywide ban on refuse burning that became effective on October 1, 1957, results in an annual cost of more than $22,920,000 to the community for refuse collection and disposal services, and resulted in the loss of a $40 million investment in single chamber incinerators.

In spite of these aggressive and intensive efforts to control air pollution sources in this county, we have been unable to halt the widespread eye irritation, reduced visibility, and other nuisance effects resulting from smog attacks. In looking to the Federal Government for assistance in solving this problem, we have not in any way sought to avoid our basic responsibilities for controlling the problem as it exists in this area. Rather, we have been forced to recognize that present-day air-pollution problems are of such complexity that a wide variety of scientific talents must be brought to bear on these problems if a solution is to be obtained. The interest of Los Angeles County, and other metropolitan and urban areas, in the Federal air pollution research and assistance program can be stated simply: For each local community to undertake the research and engineering developmental efforts necessary to answer the presently unsolved technical problems in the field of air-pollution control would be impossible. It would be impossible not only because of the tremendous financial burdens that would be created through such a duplication of effort on a national scale, but also from the inability of any single local agency to marshal the necessary technical talents, research skills, and laboratory facilities which are needed for many of these activities.

Almost since the dawn of the industrial age, residents of urban areas have been victim to the effects of atmospheric pollution. Today, the scope, severity, and complexity of air-pollution problems have so increased that air contamination must be ranked as one of the major urban and metropolitan problems of this era.

Like water, the supply of an acceptable quantity and quality of air to the Nation's rapidly growing urban and metropolitan areas has become a problem of national importance. As in the case of water, a comprehensive policy and program dealing with the problem of air conservation and use is necessary at all levels of government.

The needs of air-pollution control are as much a problem in administration, organization, and legislation as they are problems in chemistry and engineering. Indeed, it is only through proper administrative organization, through well-considered legislative policy, and through executive competence and leadership that the national problem of air pollution can be successfully solved within the next decade.

Its solution hinges on effective intergovernmental relationships between the agencies of Federal, State, and local governments and will require the integration and coordination of public research, developmental, and control activities with comparable activities being conducted by private industry and private research or academic institutions.

The enactment by the United States Congress of Public Law 159 on July 1955 contributed much toward the creation of a skeletal outline upon which can be built a truly effective national air-pollution program. Experience with the administration of that law suggests certain avenues in which further improvement and progress might be obtained:

PROGRAM EMPHASIS

Since the inception of the Federal air pollution research program, a substantial portion of the resources available to the Public Health Service has been directed to research aimed at ascertaining the effects of air pollution on human health. Over a long period of time, information of this sort certainly may prove of value in identifying contaminants and pollution sources requiring control for reasons of public health, as opposed to public nuisance effects. Diversion of the limited financial, scientific, and laboratory resources presently available for air-pollution work to medical subjects, however, does prevent the development of solutions to air-pollution problems which have already been identified and recognized as deserving of control. As an example, the exhausts from diesel trucks and buses are recognized as local nuisances everywhere in the United States. In addition, in areas such as Los Angeles, the exhaust products from gasoline-powered motor vehicles have been demonstrated to be the causative factor in the production of

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widespread eye irritation, reduced visibility, damage to growing vegetation, rubber cracking, and other smog manifestations. In the face of this evidence, it would seem much more desirable at this time to organize research and developmental programs aimed at the solution of these problems rather than to engage in the less necessary field of medical research.

To a degree, the overemphasis of the Federal program on public-health research is being rectified. During this past year, a great deal more work was done in the field of control technology and engineering than had been accomplished in the preceding years of the Federal program. It is to be hoped that this trend will continue.

NEED FOR LEADERSHIP

To a large measure, the Federal air-pollution-research program has been conducted through a technique of reviewing applications for grants and other forms of financial assistance as submitted by medical researchers and air-pollution research and control organizations throughout the United States. This technique of investigating requests of local agencies and of supplying assistance or research funds for their support results in a hit-or-miss approach to the total problem of air pollution throughout the Nation. It has been our experience that aggressive leadership is necessary in the total program. Such leadership should be directed toward a firm determination of program needs, to ascertainment of such gaps as may exist in research programs being conducted throughout the Nation, to assessment of areas where research seems necessary, and to the initiation of such research. Such an approach would be more productive and economical than merely waiting for requests to be submitted by private researchers and public jurisdictions throughout the Nation.

The technical complexity of many of the problems now confronting air-pollution-control workers demands the development of realistic research projects closely coordinated with other related but dissimilar projects. Having instigated such projects, there must be competent scientific supervision and coordination of the research activity so as to assure results capable of meeting existent needs and objectives. This kind of work cannot be accomplished in the absence of aggressive technical leadership.

IMPROVEMENT IN ORGANIZATION

The lack of aggressive leadership in the field of air-pollution research and the somewhat cloudy orientation of the Federal program might be traced to organizational problems within the United States Public Health Service. Under the law, the Public Health Service is named the responsible Federal agency for conducting and coordinating the Federal air-pollution research and assistance program. However, there is yet no clear-cut assignment of executive responsibility within the Service for air-pollution matters. Portions of the air-pollution function assigned to the Service have been delegated to its several bureaus, each of which has other more basic responsibilities. Since the Service has been traditionally a medical organization, responsible bureau executives in the Public Health Service are primarily skilled in medical specialties as opposed to the more important air-pollution-related fields of engineering, chemistry, and physics. This diffusion of responsibility and vagueness of executive responsibility for ascertaining program needs may be a contributor to the problems which have been noted in the administration of the Federal program. The organizational character of the Service also may provide an explanation for the heavy emphasis of the Federal program on public health and medical matters as opposed to the more practical problems of air-pollution-control technology.

FORCE ACCOUNT VERSUS CONTRACTUAL RESEARCH

Even though firm leadership is necessary in the conduct of needed air-pollution projects of national interest, this does not imply that the research need be conducted by Federal employees in federally owned and operated laboratories. Indeed, it would appear that worthwhile and economical results could be secured by utilizing the services of existing competent and well-equipped research agencies and laboratories throughout the Nation. This would be preferable to use of Federal funds for the development of expensive federally operated and staffed facilities. In the highly competitive scientific field of today, it is becoming increasingly difficult for governmental agencies to compete with private industry in the employment of highly competent and talented technical personnel.

Although recent months have seen an increasing trend toward use of contract research agencies, insufficient use even now is being made of the laboratory facilities and trained personnel already employed in research agencies throughout the country. In order to meet the present objectives of the Federal air-pollution program, it will be necessary for the Federal agencies to recruit and train personnel at least equivalent in skill to those available at the local level. This recruitment effort may not only delay positive results from Federal research, but will also unnecessarily dilute among the several levels of government the presently meager supply of technicians and scientists skilled in air-pollution matters. It is our opinion that the objectives of the Federal program could be met better by utilizing the skilled staffs already available in both public and private agencies, on a contract basis.

ESTABLISHMENT OF AIR-QUALITY STANDARDS

The Public Health Service has been exceedingly reluctant to offer judgment or to become concerned with the problem of establishing air-quality standards. At the same time, local jurisdictions of government which are vested with the actual responsibility for controlling air-pollution sources are encountering great difficulty in determining acceptable levels of pollution emission in order to attain any given level of air quality. Perhaps the cloudiest area in the entire field of air-pollution-control technology is that relating to determination of those contaminant concentrations in the atmosphere which can be judged as greater than nuisance levels, or even hazardous to human health. It appears to us that the United States Public Health Service is the only agency in the Nation with sufficient financial and technical resources to tackle this job.

Since its inception, authorities in Los Angeles County have voiced much criticism of the Federal air-pollution research and assistance program. In fairness to those responsible for its administration, it must be noted that the past 2 years in the history of that program have seen developments more in keeping with the recommendations and criticisms offered by the county of Los Angeles. Among the developments, improvements, and trends which we applaud are the following:

1. *Automobile exhaust research.*—During the past 2 years the Federal Government has taken the first steps toward activating research projects bearing on the problem of motor-vehicle exhausts. Although this portion of their program has not yet been expanded to a sufficiently high level, the activation of these projects certainly indicates a trend in the right direction. Among the projects bearing on motor-vehicle exhausts which are being sponsored by the Federal Government are two of particular importance to Los Angeles County. One project in the Bureau of Mines has been directed toward determination of the chemical constituents contained in motor-vehicle exhausts as these relate to the composition of the fuel employed in the engine. The second project has involved investigation of various catalysts to determine their usefulness in decomposing the smog-forming constituents contained in the exhaust. We wish to encourage research projects of this sort and suggest that other basic research and developmental projects bearing on the problem of developing a workable exhaust-phase control device would be directly related to the present needs of Los Angeles County and other metropolitan areas in the State of California.

2. *Coordination with other air-pollution agencies.*—During 1957, the Surgeon General also provided for the creation of a National Advisory Committee on Air Pollution. This committee is broadly representative of local air-pollution-control jurisdictions, public air-pollution-research agencies, and industrial groups having an interest in air-pollution control. In spite of the short life of the committee, we feel that it has contributed greatly toward improving relationships between Federal authorities, private industrial associations, and local or State air pollution agencies. It has provided for a greater appreciation by these agencies of the interests, problems, and objectives of each of the other groups. Although the advisory committee cannot be considered a substitute for an effective Federal air-pollution organizational structure, nor as a replacement for more aggressive leader-

ship at the Federal level, it has served, nevertheless, to fill certain important gaps in the program planning and administration process.

3. *Extension of grants.*—During the past 2 years also, the Public Health Service has extended several grants directly to the Los Angeles County Air Pollution Control District. These have permitted the partial financing of research and developmental activities bearing on the potential air-pollution problems posed by organic solvent losses arising from various industrial and commercial operations.

There is a continuing need for research of this sort to be performed under contractural arrangements with the Public Health Service. Some of this research can be performed by this agency (the Los Angeles County Air Pollution Control District), but a great deal more could more competently be performed by qualified private and public research agencies throughout the Nation. So long as needs are carefully determined by Federal authorities and experimental designs are evolved carefully for the projects so as to assure the accomplishment of the established objectives, continued use of contract techniques should assure maximum progress in the air-pollution field at a minimum cost to the taxpayers.

Certainly, it is always much easier to criticize a program than it is to administer it. Nevertheless, criticism is important to progress in any program, in any organization, and in any field of endeavor. Improvement, increased effectiveness, and greater efficiencies are always possible, always attainable, and always the subject of objective criticism. It is in this spirit that these comments have been offered.

The County of Los Angeles applauds the forward-looking policy which gave birth to the Federal air-pollution research and assistance program. We fully support the objectives of that program and are keenly appreciative of those services which have been extended to the Los Angeles County Air Pollution Control District by the United States Public Health Service and other Federal agencies. We recognize the difficulties involved in the development and administration of a national air-pollution research and assistance program capable of satisfying the needs of the many metropolitan and urban areas in the Nation which are now involved with air-pollution problems.

In recognizing those difficulties, however, we are firm in our belief that increased progress can be attained in the air-pollution field through continued improvements in the methodology, orientation, and organization of the Federal air-pollution program. It appears to us that these improvements can be attained through (1) a simplified organizational structure for the administration of the air-pollution activities assigned to the United States Public Health Service, (2) increased emphasis to the problems of air-pollution-control technology as opposed to the more long-range and less-productive fields of medical and public health research, (3) more aggressive leadership in air-pollution matters at the Federal level, (4) increased use of contracts with qualified research agencies as opposed to utilization of Federal laboratory facilities and technical personnel, and (5) less reliance on development of research projects through solicitation of grant-in-aid proposals from local public and private organizations, and increased emphasis on federally initiated projects directed toward the resolution of recognized air-pollution needs and problems.

ATTACHMENT 1.—*Air-pollution expenditures in the county of Los Angeles*

	1948–57 [1]	1958	Total
1. Air-pollution-control district	$10,788,416	$4,100,945	$14,889,361
2. Industry investment in control equipment	59,646,554	9,351,346	[2] 68,997,900
3. Refuse collection and disposal costs	(3)	22,920,000	22,920,000
4. Other public or private expenditures for air-pollution research	11,000,000	1,000,000	2,000,000

[1] July 1, 1948, to June 30, 1957.
[2] Through Sept. 30, 1958.
[3] No costs.

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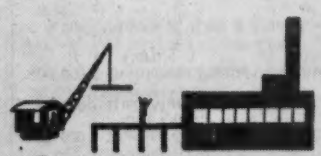
HOW THE INDUSTRIAL CONTROL SYSTEM OPERATES

1

CONSTRUCTION PLANS ARE REVIEWED

During fiscal year 1956-57 applications for approximately $94 million of industrial equipment were filed with the APCD.

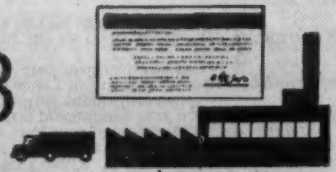
2



CONSTRUCTION PERMITS ARE ISSUED

After detailed review of the plans by APCD engineers, 2774 "authorities to construct" were issued.

3



PERMITS TO OPERATE ARE GRANTED

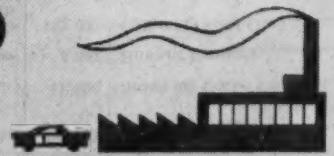
Following approval of the completed job, permits to operate were issued for $83 million of basic equipment, $9 million of control equipment.

4

INSPECTION IS REPEATED

Inspection of all potential air pollution sources is a continuing procedure. Last year 74,759 individual source inspections were reported.

5



VIOLATIONS ARE DETECTED

Routine inspections, ground and aerial patrol turned up 3,608 violations for which notices were issued.

6

ABATEMENT ACTION IS TAKEN

Formal complaints against violators result in court trials. Criminal actions filed last year totaled 3,060.

Los Angeles County "firsts" in air-pollution control

Date installation authorized	Date placed in operation	Equipment	Cost	Owner of equipment	Remarks
----------	Jan. 18, 1948	Exhaust system with baghouse serving brass-melting crucible furnaces.	$4,000	American Brass & Aluminum Foundry.	Believed to be the 1st brass furnaces of this type to be controlled anywhere.
Nov. 12, 1948	Dec. 18, 1950	Chemical plant to recover elemental sulfur from refinery waste hydrogen sulfide.	1,147,000	Hancock Chemical Plant	1st chemical plant in Los Angeles County to recover waste hydrogen sulfide gas and convert to elemental sulfur.
Aug. 10, 1949	Feb. 21, 1950	Afterburner serving a coffee roaster	1,800	Browning Coffee Co	Believed to be the 1st coffee roaster ever equipped with afteburnrer.
June 29, 1949	Aug. 25, 1949	Exhaust system and baghouse serving an electric steel-melting furnace.	2,500	Howard Foundry	Possibly the 1st electric steel furnace ever to be controlled with a baghouse.
Nov. 15, 1949	Aug. 25, 1950	Exhaust system and electric precipitator with waste heat boiler serving an open-hearth steel-melting furnace.	150,000	Columbia Steel Corp	Probably the 1st open-hearth furnace anywhere to have satisfactory air-pollution-control equipment.
Apr. 27, 1950	June 21, 1950	Afterburner for a varnish-cooking kettle	2,000	Major Paint & Varnish Co	Believed to be the 1st direct-fired afterburner and the 1st really satisfactory control device on a varnish kettle.
July 7, 1950	November 1950	Electric precipitator serving an aluminum dross-recovery plant.	30,000	Aluminum Company of America.	Probably the 1st dross-recovery plant ever controlled by a precipitator.
July 20, 1950	February 1951	Baghouse serving a galvanizing kettle	746	Superior Pacific Galvanizing Co.	1st baghouse to serve a galvanizing installation, later removed. This installation is a real "1st." The baghouse was removed because of failure, but the cause was faulty maintenance.
Aug. 24, 1950	Jan. 11, 1951	Exhaust system, a quencher and baghouse serving 2 iron-melting cupola furnaces.	15,000	General Metals Corp	1st iron cupola ever to be satisfactorily controlled anywhere (cupolas had been partially controlled by inefficient equipment previously at various places).
Nov. 16, 1950	February 1952	Pease-Anthony Venturi-Cyclone scrubber	25,000	Ferro Enamel Corp	The 1st ceramic frit smelter controls installed in Los Angeles County.
Apr. 2, 1951	May 22, 1951	Water spray cooler and baghouse filter serving an asphalt-roofing-paper saturator.	25,000	Pioneer division of the Flintkote Corp.	The 1st baghouse ever to be used to control the oil mists from an asphalt-roofing-paper saturator.
Apr. 4, 1951	Jan. 16, 1952	Electric precipitator serving an iron-melting cupola.	40,000	Rich Manufacturing Co	1st electric precipitator ever used to control a gray-iron-melting cupola furnace.
July 10, 1951	Jan. 11, 1952	Exhaust system with electric precipitator serving 2 75-ton and 1 50-ton electric steel-melting furnaces.	650,000	Bethlehem Pacific Coast Steel Corp.	1st satisfactory installation anywhere to control large electric steel-melting furnaces.
Aug. 23, 1951	Apr. 22, 1952	Exhaust system with afterburner and baghouse serving aluminum sweat furnace and a rotary aluminum chip dryer.	6,000	Morris P. Kirk & Sons, Inc.	Probably the 1st really satisfactory installation anywhere serving such equipment.

Nov. 27, 1951	February 1953	Water scrubber serving galvanizing kettles	12,000	Emsco Derrick & Equipment Co.	1st control device capable of controlling odors and gases from a galvanizing operation. Important as a "1st" but not a completely satisfactory control device since some particulate matter escapes. Does pick up some air contaminants that a baghouse cannot capture.
Feb. 1, 1952	July 20, 1953	Electrostatic precipitator serving an asphalt-roofing-paper saturator.	40,000	Celotex Corp	Believed to be the 1st 2-stage electrostatic precipitator ever installed to control a roofing-paper saturator.
Oct. 18, 1952	February 1953	Boiler firebox and crude-oil absorber serving refinery waste water system.	340,000	General Petroleum Corp	1st controls for a refinery waste water system in which separator is covered and collected gases are absorbed and incinerated.
Oct. 29, 1952	June 1953	Water scrubber coupled with electric precipitator for controlling the fumes from the fluxing of aluminum in a reverberatory furnace.	45,000	Apex Smelting Co	Believed to be the 1st such control system ever installed for the combined problem of fluoride and chloride fluxing fumes.
Nov. 14, 1952	November 1953	Water scrubber for control of fumes from air-blown asphalt manufacture.	45,000	Standard Oil Company of California.	1st installation ever to use a sea-water scrubber.
Dec. 22, 1952	do	Sour-water oxidizer to convert odorous sulfides into water-soluble thio sulfates.	30,000	Shell Oil Co	1st installation for disposal of sulfides in effluent water as contrasted to standard method of burning to sulfur dioxide.
Sept. 17, 1954	December 1954	Absorber unit employing gasoline as the absorbing medium for recovery of vapors collected from bulk loading of tank trucks.	40,000	Standard Oil Company of California.	1st installation of its type.
May 2, 1955	January 1956	Vapor collection system for gasoline loading rack at refinery.	30,000	Union Oil Co	The 1st vapor-collection system to collect escaping hydrocarbon vapors released in bulk loading of gasoline into tanker trucks at loading racks in refineries.
May 13, 1955	Nov. 26, 1956	Wet Rotoclone coupled with an electrostatic precipitator serving meat smokehouses.	10,000	Luer Packing Co	Believed to be the 1st such control device ever installed to control smoke from smokehouses.
Nov. 30, 1955	March 1957	System for control of discharge from coker unit blowdown; system consisted of water scrubber, condensers, and final discharge to refinery flare.	385,000	General Petroleum Corp	1st system for control of hydrocarbons from coker unit blowdown.
Nov. 29, 1955	April 1956	Flue gas heater serving a fluid catalytic cracking unit.	80,000	Union Oil Co	1st installation on an FCCU discharge to prevent formation of hydrated sulfur trioxide and resulting plume.
Dec. 20, 1955	Apr. 26, 1956	Direct flame afterburner on a paint bake oven.	5,000	Rheem Manufacturing Co	Although not a large installation this is believed to be the 1st time a paint bake oven was equipped with a direct flame afterburner.
Jan. 10, 1956	Apr. 17, 1956	Direct flame afterburner serving meat smokehouse.	3,900	Young's Market Co	Believed to be the 1st direct flame afterburner ever installed on a meat smokehouse.
July 9, 1956	October 1956	Baghouse with radiant cooling ducts on glass furnace.	8,500	Metallon Products, Inc., Tegco division	1st installation of control system on glass furnace in Los Angeles County.
Dec. 18, 1956	Mar. 31, 1958	Direct fired afterburner on a large paint baking oven.	16,000	Mercury division, Ford Motor Co.	Believed to be the 1st installation of its kind on an automobile paint bake oven. This unit was the 1st of 5 installed during the same period.

Los Angeles County "firsts" in air-pollution control—Continued

Date installation authorized	Date placed in operation	Equipment	Cost	Owner of equipment	Remarks
Jan. 23, 1957	Mar. 14, 1958	Activated carbon vapor adsorber on a 5-color rotogravuer printing press.	$48,000	Robert Gair division of Continental Can Co., Inc.	Believed to be the 1st regenerative activated carbon adsorber unit serving rotogravure press and which was installed strictly for air-pollution-control purposes (installations have been made elsewhere for solvent recovery).
Jan. 23, 1957	Mar. 12, 1958	Activated carbon adsorber serving 47 paint-mixing tanks.	10,000	Fisher Body division of General Motors Corp.	Believed to be the 1st such installation made at an automobile manufacturing plant for the purpose of controlling air pollution by paint solvents.
Jan. 31, 1957	Apr. 30, 1958	Catalytic afterburner on paint bake oven in an automobile assembly plant.	70,000	do	Believed to be the 1st catalytic afterburner installed to control paint baking oven in an automobile assembly plant. This unit was the 1st of 4 installed during this period.
Mar. 22, 1957	Oct. 9, 1957	Exhaust system with baghouse serving 4 stereotype metal-melting pots.	9,000	Times-Mirror Co	Believed to be the 1st such controls ever installed at a printing establishment to control metal-melting operations.
Nov. 20, 1957	Jan. 7, 1958	Direct fired afterburner serving a plastic curing oven.	2,800	Industrial Rack Co., Inc	Believed to be the 1st afterburner ever installed to control the discharge from a plastisol curing oven.
	Feb. 4, 1958	Activated carbon adsorber installed to control solvent losses from a dry-cleaning plant.	4,100	Clock Cleaners	1st such installation in Los Angeles County.
Apr. 21, 1958	To be completed in 1959.	Electric precipitator serving a 1,254,000-pound-per-hour oil-burning steam generator.	1,000,000	Southern California Edison Co.	This is the 1st time any oil-burning steam generator has ever been equipped with an air-pollution-control device other than controls for soot blowing.

EXHIBIT D. STATEMENT OF DR. JOHN MIDDLETON, CONSULTANT, LOS ANGELES COUNTY AIR POLLUTION CONTROL DISTRICT

AIR POLLUTION CONTROL DISTRICT,
Los Angeles, Calif., December 2, 1957.

Congressman L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee, Committee on Government Operations, House of Representatives, Washington, D. C.

DEAR CONGRESSMAN FOUNTAIN: Unfortunately Dr. John Middleton was unable to appear and offer personal testimony before your committee during its hearings in Los Angeles County.

Since Dr. Middleton serves not only as chairman of the committee on air pollution research of the University of California, but also as a consultant to the Los Angeles County Air Pollution Control District, we are forwarding herewith a copy of some comments that Dr. Middleton feels might be of interest to your committee.

Very sincerely yours,

S. SMITH GRISWOLD,
Air Pollution Control Officer.

UNIVERSITY OF CALIFORNIA,
AGRICULTURAL EXPERIMENT STATION,
Riverside, Calif., November 7, 1957.

Memo to:

CHAIRMAN FOUNTAIN,
Intergovernmental Relations Subcommittee, Committee on Government Operations, House of Representatives, Washington, D. C.:

The following material is presented for the purpose of informing the committee of some of the needs in research in air pollution as it affects the agricultural economy of California and the Nation. It is my hope that this will become a useful part of the committee's record. Although I recognize this is not the time to produce technical evidence of the manifestation of damage to vegetation from air pollution, it is essential to advise you of the severity of this economic loss as it affects California and other States in this country. Annual losses due to visible injury symptoms amount to somewhat more than $6 million in the State of California. There are no dollar estimates for economic losses due to reduced growth, reduced yields, and impoverished food quality due to the effects of agricultural crops being exposed to contaminated air. It is a common opinion, however, that the latter are 5 to 10 times as important as the visible injury losses.

The basic needs in agricultural studies both here and throughout the country pertain to the nonengineering aspects of the activities of the United States Public Health Service. It is rather apparent that no control for abatement of air pollution is effected by medical knowledge. Information regarding the effects of various toxicants, which obviously must be priorly described, will assist abatement officers in knowing the limit to which the pollutants should be reduced, but it in no way points out what pollutant must be reduced, nor how it should be controlled. The United States Public Health Service should make every effort to see that the funds, which are extremely inadequate, be spent prudently, wisely, and to the point of air conservation. This behooves the Public Health Service to very critically review their medical research program, and where possible give real impetus and financial implementation to the engineering and nonmedical aspects forthwith.

As a matter of record there is in the Proceedings of the Air Pollution Research Planning Seminar of the United States Department of Health, Education, and Welfare conducted in Cincinnati, Ohio, on December 18, 19, and 20 of 1956, a rather extensive report on various aspects of air pollution research. In this record I should call your attention to page 143 in which the United States Department of Agriculture is mentioned and criticized adversely for their lack of participation and apathy in entertaining research in air pollution. There is very little excuse for the United States Department of Agriculture not participating actively in this program, simply because the Department already has research facilities and management services which can cope with environmental

problems and the basic aspects of any research program. Over the years there has developed a very serious breach of confidence between industrial research in air pollution and opinions and attitudes and lack of research in the Department of Agriculture. I quote one or two sentences from page 143:

"If confidence can be established between these several groups, the millions of dollars that have already been expended in air-pollution studies may make available to all concerned the accumulation of research data by these groups. This confidence, I am frank to state, does not presently exist. It must be developed. The Public Health Service and the Department of Agriculture can supply the leadership and direction required and surely should apply themselves to the problem with vigor."

The Public Health Service has appointed C. S. Brandt as liaison officer between Agriculture and the Public Health Service. This perhaps indicates a step in the right direction. But progress only comes from repeated steps and in an animated gait.

Last year there was litigation throughout the United States over $50 million in losses due to the accumulation of fluorine in vegetation and livestock. This is a problem that involves States from Florida to Washington and California—Utah—throughout the Southeast. There is no research agency adequately coping with the manifold problems requisite to the resolution of such litigation. Private industry in the form of the United States Steel Co. and many other commercial concerns, as well as some of the State agricultural experiment stations are doing some work in this regard. Surely the United States Department of Agriculture is of such dimension that it should appreciate the need of a citizenry and the Public Health Service sufficiently astute to see that any aid is given toward solution of these very vexing problems. The fluorine problem being United States wide surely should come under the influence and perhaps dominance of the Federal Government insofar as research in this air-pollution problem is concerned. Some effort has been given through the Public Health Service by way of grants-in-aid, but very often, due to the system of review committees responsible for the allocation of funds, moneys devoted for research in air pollution are frequently misspent or ill advisedly located in areas where competency is wanting, but funds are needed.

I realize the difficulties in allocating funds inasmuch as I have some responsibility in this regard myself. I do recognize, however, that the older functions of the Public Health Service do not well serve some of the modern needs. Some serious consideration and action should be given to a proper group assessment of proposals and assignment of funds prior to entering into contractual arrangements such as now exist.

Although we talk very easily about the materials responsible for the type of damages that occur in urban air-polluted districts, we still do not know the chemical identity of the materials involved. We believe them to be partially oxidized organic materials and there is some good support for this view. However, abatament agencies perhaps could forthwith control specific pollutants if more precise information were available on the specific causes of some of the manifestations of urban pollution. This type of research involves plants as a bioassay system, but calls explicitly upon the physical and chemical methods, techniques, and knowledge which come from engineering and nonmedical aspects of the Public Health Service program.

I submit to you that a proper review be made of allocations of funds for agricultural purposes throughout the Nation and naturally to include California and how these funds are distributed among the various kinds of pollutants and the several facets of our agricultural economy, in order that a proper appraisal, reevaluation, and perhaps reassignment of funds can be made toward a more direct and profitable research endeavor leading to the much needed abatement of pollution not only in the urban areas, but in districts about specific known polluters.

If I may serve you and your committee further, please call upon me.

JOHN T. MIDDLETON,
Chairman, Statewide Agricultural Air Pollution Advisory Research Committee.

EXHIBIT E. CORRESPONDENCE BETWEEN KENNETH HAHN, SUPERVISOR, SECOND DISTRICT, LOS ANGELES COUNTY BOARD OF SUPERVISORS AND VARIOUS AUTOMOBILE MANUFACTURING COMPANIES CONCERNING AUTOMOTIVE EXHAUST POLLUTION CONTROL

FEBRUARY 19, 1953.

Mr. HENRY FORD II,
President, Ford Motor Co.,
Detroit, Mich.

DEAR MR. FORD: As one of the five supervisors of Los Angeles County—the largest county governmental unit in the Nation—I am vitally concerned with the problem of air pollution.

It is my understanding that air pollution (described in this area as smog) is not unique to this locality but is aggravated by peculiar geographical conditions.

Air pollution in this area has in recent years become a matter of major public concern as the effects of the pollution are adverse to the health, welfare, and economy of the county. The subject has been constantly under study and while claims of progress have been made, the smog hanging in the air on certain days effectively disputes the claims as far as the general public is concerned. Some of the studies have indicated that air pollution results from a combination of many factors, from the relatively innocuous smoke of backyard incinerators to exhaust fumes from automobiles and buses, smoke from industrial plants, and vapors from gasoline refineries and storage tanks.

I am extremely interested in learning what can be done to combat effectively each of the known causes of air pollution.

Los Angeles County has the largest per capita concentration of motor vehicles in the world. During the past 10 years the number of automobiles in the county has doubled, and now, with a population of approximately 4 million, Los Angeles County has about 2 million automobiles. While the exhaust fumes from these vehicles may not be the major cause of smog, it definitely appears that these gases contribute to the problem.

I am interested in learning whether your organization has conducted, or is conducting, research or experimentation designed to eliminate or substantially reduce exhaust vapors. If you have conducted such experiments, I would appreciate any information you can provide, especially on the following points:

1. Are there any devices which can be attached to automobile exhaust manifolds or pipes which would effectively reduce exhaust gases?
2. If so, can these devices be produced inexpensively on a mass scale?
3. If there are not any such devices, is work being done to perfect anything to accomplish the same result? If so, what progress has been made?
4. What progress, if any, has been made (which could be practicably applied on a large scale) toward more complete combustion of fuel?
5. Are there any known solutions or compounds which could be added to gasoline which would counteract or render harmless the exhaust vapors?

Any reference material or other information you can provide will be very helpful.

Very truly yours,

KENNETH HAHN,
Los Angeles County Supervisor.

FORD MOTOR CO.,
Dearborn, Mich., March 3, 1953.

Mr. KENNETH HAHN,
Los Angeles County Supervisor, Los Angeles, Calif.

DEAR MR. HAHN: The Ford engineering staff, althoug mindful that automobile engines produce exhaust gases, feels these waste vapors are dissipated in the atmosphere quickly and do not present an air-pollution problem. Therefore, our research department has not conducted any experimental work aimed at totally eliminating these gases.

The fine automotive powerplants which modern-day engineers design do not "smoke." Only aging engines subjected to improper care and maintenance burn oil.

To date, the need for a device which will more effectively reduce exhaust vapors has not been established. However, considerable research has been directed toward more efficient fuel combustion.

Very truly yours,

DAN J. CHABEK, *News Department.*

GENERAL MOTORS CORP.,
Detroit, Mich., March 20, 1953.

Mr. KENNETH HAHN,
Board of Supervisors, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of February 19 to Mr. H. H. Curtice has been passed along to the undersigned for reply.

Your efforts to abate air pollution, as we have seen the problem growing in Los Angeles County, have been discussed with a number of interested groups in General Motors, particularly the GM industrial waste-control committee.

Some of the same sort of study, but without the extreme pressure which obtains in Los Angeles, is going on here in the Detroit industrial district.

A joint industry conference is starting to consider the problem as outlined by the United States-Canada treaty group; to cover an area from Lake St. Clair to the Huron River, along the Detroit River, and 15 miles each side of the border.

General Motors has been conducting research on methods of reducing the nuisance of automotive exhausts but has not undertaken any development on the elimination of exhaust, because of the fact that the fuel mixtures used in internal-combustion engines undergo combustion along well-recognized chemical and physical lines and result in exhaust products, depending on the combustion processes.

While it is possible to have poor mixture and ignition, etc., and by so doing vitiate the normal cycle by causing an improper combustion and exhaust, this is the result of maladjustment and will not ensue from the normal internal-combustion engine cycle.

For technical coverage of the points you raise, we are handing your letter to Mr. John M. Campbell, head of organic chemistry, in the research laboratories division, who will answer your points in detail.

Very truly yours,

L. A. DANSE,
Assistant Director, Committee Activities.

RESEARCH LABORATORIES DIVISION,
GENERAL MOTORS CORP.,
Detroit, Mich., March 26, 1953.

Mr. KENNETH HAHN,
Los Angeles County Supervisor,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of February 19 addressed to Mr. H. H. Curtice has been referred to the research laboratories by Mr. L. A. Danse who wrote to you on March 20.

General Motors has been cognizant of the exhaust-gas problem for many years and the research laboratories of General Motors have been responsible for the discovery of much of the basic information on exhaust gas that is available today on this subject.

Carbon monoxide has generally been considered the principal component of exhaust gas that is injurious to health. Through improvements in carburetion, ignition, and engine design, we have reduced the average carbon monoxide content of exhaust gases by a very significant amount over the past 20 years. We have not yet found out how to eliminate carbon monoxide entirely in a practical way that would be acceptable in cars that we have to sell to the public. Nevertheless, we are still seeking improvements in this direction because at the same time these improvements will lead to more miles per gallon to the car owner, which is a very desirable and tangible end in itself. We cannot say how soon we will be able to make improvements of this kind because we have not yet been able to do this in any practical way.

The information that is available to us does not indicate that carbon monoxide is present in harmful amounts in the Los Angeles atmosphere and so we have not been concerned about the imminence of a serious health problem from this source.

More recently, studies made by various investigators in Los Angeles have indicated that certain hydrocarbon effluents from automobile exhaust gases may be a contributing factor to the smog and particularly to the eye-smarting components of the smog. As far as we are aware, Los Angeles is the only community having this particular complaint, although other communities appear to have concentrations of carbon monoxide just as high or higher than those found in Los Angeles, indicating that perhaps some other factors than automobile exhaust gases may be contributing to this problem.

Our research laboratories are studying this problem very carefully at the present time. Here again, we do not yet see our way through to any solution because we are already doing everything we know how to do in the attainment of the highest possible combustion efficiency and the lowest possible consumption of a lubricating oil. And this is perhaps an important principle for your consideration; namely, that the automotive industry has a natural engineering incentive to make every effort in the direction of a reduction of undesirable components in exhaust gas because these efforts are consistent with the natural engineering incentive toward improved fuel economy and lower oil consumption.

In regard to your question concerning devices that might be attached to the exhaust manifold to reduce the amount of exhaust gases, we do not know of such a device. Engines require air for breathing and it takes just so much air to do a given amount of work. Exhaust gas is an inevitable byproduct of the process. Improvement of combustion efficiency would reduce the volume of exhaust gas somewhat but not significantly.

Many attempts have been made to burn the combustible substances that are present in exhaust gases either with or without a catalyst and there are many patents on such devices, including some of our own. Among the devices which we have tested is a catalytic muffler manufactured by the Oxy-Catalyst Corp. We have had this unit in intermittent operation for 9 months on a forklift truck using unleaded gasoline. At the present time, however, we do not know of any devices that meet the important requirement of being both dependable over the wide range of operating conditions to which they are subjected in automobile operation and at the same time are inexpensive even if made in large quantities.

We do not know of any chemicals that can be added to gasoline to reduce the amount of objectionable constituents of the exhaust gases.

Finally, it might be said that our organization and others are continually seeking a practical solution to every one of the problems which you have enumerated and just as fast as practical solutions, even partial ones, are found they will be put into commercial use because of the continual competitive incentive toward making engineering improvements in the automotive industry.

We appreciate your inquiry and assure you that we have accepted our share in this problem as an engineering challenge.

Yours very truly,

J. M. CAMPBELL, *Administrative Director.*

COUNTY OF LOS ANGELES,
BOARD OF SUPERVISORS,
Los Angeles, December 14, 1953.

Mr. L. L. COLBERT,
President, Chrysler Corp., Detroit, Mich.

DEAR MR. COLBERT: By scientific facts, it has been called to the attention of the board of supervisors by recognized authorities that automobile fumes coming from the exhaust contribute to the air pollution in Los Angeles County to a considerable degree.

I have received a legal opinion from our county counsel, Mr. Harold W. Kennedy, which states that the board of supervisors of this county, sitting as air pollution control district members, may pass such legislation that is reasonable and could require the automobiles sold in this county to be equipped with a device approved by the air pollution control district.

Realizing that the automobile industry of America is one of the factors that contributes to making America strong, as well as providing the people of the

United States and the world a high degree of comfort, convenience, and safety, I know you are interested in providing the public the highest standard of automobile design. A great public service could be rendered to the people of Los Angeles County, and to the people of other large metropolitan areas, if a device could be invented and installed on automobiles to prevent harmful motor vehicle fumes from polluting the air.

I realize that this problem has to be solved at the engineering level by the automobile industry, rather than by legislation. I would certainly appreciate it if you could let me know what your company is doing in this important field of research in engineering on developing either a type of engine or a device that would remove the harmful fumes from polluting the atmosphere.

Enclosed for your information is a copy of the opinion written by the county counsel, and also a report from the Governor's committee on smog.

Very truly yours,

KENNETH HAHN.

CHRYSLER CORP.,
Detroit, Mich., December 23, 1953.

Mr. KENNETH HAHN,
Supervisor, Second District, Board of Supervisors,
County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of December 14 to Mr. Colbert, regarding air pollution in Los Angeles County, has been noted by him and he has referred it to me for reply.

Of course, we are interested in continuing research on the problems which you raised in your letter and are working extensively to these ends in our laboratories.

In addition, we have joined with other companies in the Automobile Manufacturers Association to form a technical committee devoted to study and research on this problem.

I understand that this committee has been in touch with you and intends to continue further studies in the Los Angeles area at an early date.

Thank you for your letter and the information you sent with it.

Yours very truly,

JAMES C. ZEDER, *Vice President.*

GENERAL MOTORS CORP.,
Detroit, Mich., December 28, 1953.

Mr. KENNETH HAHN,
Board of Supervisors, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: We have your letter of December 14 addressed to Mr. Curtice concerning the control of automobile exhaust gases in relation to the Los Angeles smog problem.

Our research division has kept in close touch with this problem, and over the years there have been definite improvements in engine combustion that have resulted in a reduction of certain pollution in exhaust gases generally. A large portion of our research and engineering effort is directed toward improving combustion in the internal-combustion engine in an effort to gain improved fuel economy from our automobiles. This research bears directly on this problem and is aimed toward a reduction of combustible materials in the exhaust which are believed to contribute to the smog problem.

We recognize that this problem is intensified in the Los Angeles district as a result of natural geographical and meteorological conditions, and we are taking steps to intensify our own research effort to find ways and means of bringing about a reduction in pollutants insofar as they may be derived from the automobile, bus, and truck exhaust gases in local areas such as Los Angeles where there may arise concern regarding public health and well-being.

In this connection you may be interested to know that the Automobile Manufacturers Association has recently appointed a committee known as the automotive combustion products committee to study this problem very carefully and to make recommendations regarding industry action. It is expected that this committee will be in Los Angeles during the latter part of January.

In closing I want to thank you for keeping us informed and, particularly, for forwarding a copy of the report of the special committee on air pollution made to Governor Knight's air-pollution control conference.

Yours very truly,

C. A. CHAYNE,
Vice President, Engineering.

PACKARD MOTOR CAR CO.,
Detroit, Mich., December 30, 1953.

Mr. KENNETH HAHN,
Supervisor, Second District,
County of Los Angeles Board of Supervisors,
Los Angeles, Calif.

DEAR MR. HAHN: I have read with interest your letter of December 14 plus the attachments and can assure you that Packard has always attempted to incorporate in their automobiles the highest design standards with the utmost comfort, convenience, and safety. In 1927, Packard constructed its own proving grounds—a facility of over 500 acres, because we knew that comparative tests were no longer possible to attain on the public roads even at that time.

Our engineering department has at its disposal various types of analytical equipment and, through constant research and experimentation, have increased the efficiency of burning fuel manyfold in the last several years. Such experiments as to secure complete combustion of fuels have, and will continue to be worked on through carburetion, manifolding, oil control, combustion-chamber design, and other engine components affecting this problem.

Being fully cognizant of its responsibility to the people of the world wherever Packards are used, the Packard Motor Car Co. feels it is obligated to assist in any way practical when problems such as you have in Los Angeles develop. Our engineering department has been following closely reports on the Los Angeles air-pollution situation and are represented on the Automobile Manufacturers Association subcommittee whose scope is to investigate thoroughly all available information on technical aspects of the air-pollution problem as it relates to motor vehicles and, on the basis of this work, develop an industry program for dealing with the problem.

You can be sure that we will do our part at the engineering level to assist you in the work you are doing.

Sincerely,

J. J. NANCE, *President.*

FORD MOTOR CO.,
ENGINEERING STAFF,
Dearborn, Mich., January 15, 1954.

Mr. KENNETH HAHN,
Los Angeles County Supervisor,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of December 14, 1953, to Mr. Henry Ford II has been referred to the engineering staff for reply. We have carefully considered your comments and the various attachments to your letter.

As might be expected, we have devoted considerable research over a period of years toward improving the combustion efficiency of our engines. Currently, we are participating in the work of the recently formed vehicle combustion products subcommittee of the Automobile Manufacturers Association. This subcommittee formalizes the individual and cooperative effort that has been carried on in the past by the automobile companies studying problems such as you have referred to in your letter. The subcommittee is aware of the Los Angeles smog situation, and is, in fact, planning a trip to Los Angeles for the latter part of this month in order to make a technical survey of the studies which have been made on the Los Angeles smog problem. The group plans, of course, to contact the Los Angeles Air Pollution Control District.

Our engineering staff is represented on the AMA vehicle combustion products subcommittee, and is cooperating with the committee with respect to this matter in every possible way.

Thank you for your letter and the attached information.

Very truly yours,

J. M. CHANDLER,
Unit Supervisor, Engineering Research Department.

COUNTY OF LOS ANGELES,
BOARD OF SUPERVISORS,
Los Angeles, October 18, 1954.

Mr. H. H. CURTICE,
President, General Motors Corp., Detroit, Mich.

DEAR MR. CURTICE: On February 19, 1953, I wrote to you, pointing out that auto exhaust fumes contribute to the pollution of air in Los Angeles County and requested information as to what was being done to reduce exhaust gases.

On March 26, 1953, Mr. J. M. Campbell of your organization replied that "we have accepted our share in this problem as an engineering challenge."

During the intervening 19 months, it has been established by scientific observation and tests that the pollutants from the exhausts of motor cars, trucks, and buses daily contribute in excess of 1,000 tons of hydrocarbons into the atmosphere of Los Angeles. This information indicates that the motor-vehicle exhaust is a major factor in producing smog.

Unless I am mistaken, General Motors, as well as the rest of the automotive industry, has been made aware of the importance of developing some device which will eliminate or greatly reduce this source of air pollution.

Yet, I am informed, to date there has not been developed any device that will satisfactorily counteract or eliminate the auto exhaust's contribution to air pollution.

It is my opinion that the automotive industry must assume the responsibility of rapidly finding a solution to this most important problem. It is the industry's obligation to expedite this research and development program to the highest degree possible. I am not convinced that this has been done during the past 19 months.

The people of this county, who own and drive the world's greatest concentration of motor vehicles, are entitled to the best possible consideration from the automotive industry.

Very truly yours,

KENNETH HAHN,
Los Angeles County Supervisor.

GENERAL MOTORS CORP.,
Detroit, November 2, 1954.

Mr. KENNETH HAHN,
Board of Supervisors, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: Mr. Curtice has referred your letter of October 18 to me for reply. Unfortunately, due to my absence from the country this letter has been somewhat delayed.

First let me say that we fully appreciate the intensity of the smog problem that existed in Los Angeles during the past few weeks and to a lesser degree at other times during the year.

Since our correspondence dated February 13, 1953, and referred to in your letter, we have conducted an extensive program of research on this problem. This program has included our collective efforts sponsored by the Automobile Manufacturers Association as well as our own individual efforts made in the General Motors research laboratories.

The Automobile Manufacturers Association has initiated an investigation of methods of exhaust gas analysis with particular reference to hydrocarbons to be followed by a statistical investigation of the actual composition of exhaust gases from representative automobiles, trucks, and buses. These investigations are a necessary prelude to industry action on this problem.

In our own investigations at General Motors we have made considerable progress. Our newer cars equipped with overhead valve V–8 engines and automatic transmissions are a distinct improvement in respect to hydrocarbons in exhaust gas. In addition we now have several cars equipped with experimental devices which still further reduce the amount of unburned hydrocarbons appearing in the exhaust gases. Although these latter devices are still very much in the laboratory stages, we are hopeful that the principles employed in them can be incorporated successfully in designs suitable for production. However, it must be recognized that the transition from a proven experimental model to a commercial production design will require a great deal of further consideration and testing by our manufacturing groups before we could possibly be in a position to offer anything to the public. This is merely following standard practice that has been found to be essential in our industry.

In short, we believe that our industry will soon be in a position to make recommendations which should point the way to reduction of hydrocarbons in automotive exhaust gases. While I can thus assure you that we are moving forward, I would be less than candid, however, if I failed to point out that we believe that these changes on automotive vehicles alone will have only a very limited influence on the total smog problem in Los Angeles.

As you may know, I expect to speak before the Air Pollution Control Association in Los Angeles on November 4 and I hope I may have the pleasure of seeing you and your associates on the board of supervisors during my visit there.

Yours very truly,

CHARLES A. CHAYNE, *Vice President.*

APRIL 13, 1956.

Mr. HENRY FORD II,
President, Ford Motor Corp.
Dearborn, Mich.

DEAR MR. FORD: Are you planning to install on the 1957 models of your Ford automobiles and trucks a device to eliminate air pollution?

If so, I am planning to introduce a county ordinance which will require that all new automobiles, buses, and trucks, before they are sold in Los Angeles County, be equipped with a device that is approved by the air-pollution control officer of Los Angeles County.

Progress which has been made in Los Angeles County during the past 7 years in eliminating air pollution from industrial sources, including petroleum refining and processing, has been offset or neutralized by the increase in the number of automobiles in Los Angeles County which contribute to air pollution.

As you may know, Los Angeles County contains the world's highest concentration of motor vehicles—with some 2,700,000 automobiles, trucks, and buses registered out a population of 5 million persons. Scientific evidence has determined that the automobile is the largest single uncontrolled source of air pollution. Therefore, I am sure that you understand how imperative it is, for the health and welfare of the people of this great country, that the automobile industry fulfills its responsibility by providing air-pollution control devices on all new cars being manufactured and sold here.

For your information I am enclosing a copy of an opinion rendered by Harold W. Kennedy, Los Angeles County counsel, stating that the Los Angeles County Board of Supervisors has the power to pass an ordinance requiring that all new automobiles sold in Los Angeles County be equipped with a device to eliminate air pollution.

Very truly yours,

KENNETH HAHN,
Supervisor, Second District.

FORD MOTOR CO.,
Dearborn, Mich., April 24, 1956.

Mr. KENNETH HAHN,
Supervisor, Second District, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of April 13, 1956, to Mr. Henry Ford II, has been referred to me for handling.

As I am sure you are aware the entire automobile industry is working cooperatively, through the vehicle combustion products subcommittee of the Automobile Manufacturers Association, to do whatever it can to reduce those emissions in automobile exhaust which might be a factor in smog formation. Our program is based, as you know, on the determination of exhaust-gas composition, with particular emphasis on hydrocarbons, of unburned fuel, during all driving cycles. We are also endeavoring to develop means for reducing hydrocarbon emission in exhaust gas during deceleration, a driving cycle which not only may allow the most amount of unburned fuel to escape, but which also lends itself most readily to corrective action.

As part of our program to determine exhaust-gas composition, we have had to develop and acquire instrumentation which did not exist before in order to measure hydrocarbon emission continuously, as in a deceleration. We are using these newly acquired instruments to determine hydrocarbon emission

from our standard cars, and to evaluate devices designed to reduce hydrocarbon emission during deceleration.

While we have had deceleration devices on test for some time (our engineers indicate that some of these were shown to you on your last visit to Detroit), we have not yet been able either to evaluate them completely or to develop them to a point where they will not impair the normal performance you expect from your automobile.

We have, however, established the 1958 model year as a goal for the production of deceleration devices, providing, of course, that both your air pollution control officer and ourselves are convinced that the proposed devices will measurably reduce hydrocarbon emission from automobiles operating in your area.

Thus, in addition to knowing hydrocarbon emission rates with and without devices, we also need to know the driving habits of the average driver in your area. To obtain that information, members of the Automobile Manufacturers Association vehicle combustion products subcommittee will be in Los Angeles the first week of May to run a traffic survey. This survey will, we hope, give us a picture of the average driver's driving habits in Los Angeles, with particular emphasis not only on the percentage of time he spends in deceleration, but on the types of decelerations he goes through. Only this basic information will allow us to determine the effectiveness of any deceleration device.

We will be working on this survey with personnel of the air pollution control district, who have been kind enough to offer us test facilities and test drivers.

I hope this letter provides the information you wanted in regard to the automobile industry's program on air pollution. I have, obviously, not attempted to cover in detail all of the many activities we are carrying out in Detroit in an effort to help you with your smog problem. Please let me know if there is any further information which you might like.

Very sincerely yours,

E. S. MACPHERSON,
Vice President, Engineering.

CHRYSLER CORP.,
Detroit, Mich., April 24, 1956.

MR. KENNETH HAHN,
Supervisor, Second District,
County of Los Angeles, Board of Supervisors,
Los Angeles, Calif.

DEAR MR. HAHN: In your letter of April 23, 1956, addressed to Mr. Colbert, you asked whether we intended to install anti-air-pollution devices in the 1957 Chrysler automobiles. The answer at this time would be a very much qualified "yes" if by "1957 models" you refer to those which are introduced late in 1957 and are usually referred to by us as the 1958 cars.

As you know, we in the industry are conducting a very substantial cooperative program through the Automobile Manufacturers Association to develop such devices in time to discuss their introduction with your honorable board during the early part of 1957. We are also conducting an extensive effort to develop the necessary data for establishing the reductions of organic contributions which these devices would make possible, so that a sound decision as to the desirability of introducing them could be made by you.

Both of these programs are proceeding on schedule, and we have been conferring at regular intervals with Mr. Griswold and his associates at the air pollution control district. As a matter of fact, we will be meeting with him during the week of April 30 to discuss many phases of this complex problem.

Chrysler Corp. will continue to cooperate to the fullest extent in all phases of this most important effort so that the benefits of it will be obtainable by Los Angeles in the shortest possible time.

Yours very truly,

C. M. HEINEN,
Assistant Chief Engineer, Materials Laboratories.

GENERAL MOTORS CORP.,
Detroit, May 1, 1956.

Mr. KENNETH HAHN,
Board of Supervisors, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: In reply to your letter of April 13, addressed to Mr. Curtice, we are not in a position to offer a device on 1957 models for elimination of air pollution.

Working with the Automobile Manufacturers Association, we have had some hopes of being in a position by the end of this year to have some prototype devices to offer the Los Angeles community for consideration and for its judgment of whether such devices would make enough of an impression on the air-pollution problem to warrant action requiring such devices on new cars.

Assuming that we were successful in meeting this projected time schedule, however, we could not possibly have such devices ready for 1957 production, because of the time required for tooling after the decision is made to accept such a device.

I can assure you that we are cognizant of the problem and we are doing everything in our power to devise means of improving it insofar as the automobile is concerned.

During the week of April 30, there will be a number of people representing the Automobile Manufacturers Association in Los Angeles and they are planning to discuss current progress on this problem with the air pollution control district and to make some traffic studies in connection with this problem.

Sincerely,

CHARLES A. CHAYNE, *Vice President.*

COUNTY OF LOS ANGELES,
BOARD OF SUPERVISORS,
Los Angeles, July 16, 1957.

Mr. H. H. CURTICE,
President, General Motors Corp.,
Detroit, Mich.

DEAR MR. CURTICE: I would sincerely appreciate it if you would let me know if General Motors Corp. is planning to install on its 1958 model automobiles a device (either a new type muffler or engine device) which will eliminate or help reduce the pollution problem of Los Angeles County.

I believe that the only sound and practical method to reduce the air pollution coming from the motor vehicle must originate with the automobile industry, which should equip the automobiles with a good control device as they are manufactured in Detroit.

On February 19, 1953, I wrote you asking what efforts your company was making toward the reduction of air pollution coming from automobile engines. I wrote you again on December 14, 1953, urging that the automobile-manufacturing industry assume its responsibility in solving this problem for the health and welfare of the people of Los Angeles County.

On September 19, 1955, on my motion, the board of supervisors sent you a telegram stating the urgency of the problem and requesting that the development of an antismog device be expedited. I again wrote you on April 13, 1956, asking for a progress report on your work toward developing a control device.

Substantial progress has been made by Los Angeles County toward elimination of smog, and controls have been established over all known sources of air pollution except the automobile and certain phases of the petroleum industry.

The health and welfare of the nearly 6 million people in Los Angeles make it imperative that a solution to the problem of the automobile exhaust be attained at the earliest possible date.

While I was in Detroit last year, I visited your engineering division. I was impressed with your air pollution research to that time. I trust that General Motors Corp. will be able to develop and install an air pollution control device on its 1958 motor vehicles and that your company will not unnecessarily drag or delay development of this badly needed device to elminate pollution from the automobile.

Very truly yours,

KENNETH HAHN,
Supervisor, Second District.

FORD MOTOR CO.,
ENGINEERING STAFF.,
Dearborn, Mich., July 24, 1957.

Mr. KENNETH HAHN,
Supervisor, Second District,
Los Angeles, Calif.

DEAR MR. HAHN: Your letter of July 16, 1957, to Mr. Henry Ford II has been referred to me for handling.

As you know, the automobile industry recognized its responsibility in the smog problem several years ago and, as a result, has been engaged in a vigorous program to reduce possible air pollutants in automobile exhaust. Our program has involved many highly qualified technical people and has cost several million dollars to date.

On August 16, 1957, the Automobile Manufacturers Association is sponsoring a symposium on air pollution at the national west-coast meeting of the Society of Automotive Engineers in Seattle, Wash. Technical papers will be presented which will describe in detail the activities of the automobile industry in regard to air pollution and automobile exhaust. These papers should provide you with many of the answers to the questions you asked in your letter.

Referring to the application of devices to production automobiles, I might emphasize that the industry has worked intensively on induction-system devices for reducing hydrocarbon emission during deceleration and has, in fact, supplied the Los Angeles Air Pollution Control District with preliminary working models of these devices for evaluation by the district. Further work in Detroit since these devices were submitted has resulted in making the devices more acceptable from a driving standpoint, and these improved devices are also being made available to the air pollution control district at their earliest convenience.

As we have stated in our earlier letters, it is quite important that any device which we submit be very carefully evaluated by your air pollution control district so that any possible benefit to be derived from such a device can be clearly determined. The automobile industry has accepted the responsibility for reducing hydrocarbon emission from automobile exhaust to the best of its ability. It is, however, up to your local authorities to determine whether or not such a reduction will result in any reduction in the smog problem. It is thus essential that the evaluation of the devices be most carefully and thoroughly made so that a decision will not be reached which might result in unnecessary expenditures by the people in Los Angeles.

I hope you can find time to attend the SAE meeting in Seattle on August 16. I am sure that you will find it well worth while and that the technical findings as reported by the industry at this meeting will be of utmost interest to you. I will thus hope to see you in Seattle or, possibly, earlier in that same week in Los Angeles.

Very truly yours,

J. M. CHANDLER,
Section Supervisor, Test Engineering Section, Engineering Research.

CHRYSLER CORP.,
Detroit, Mich., July 24, 1957.

Mr. K. HAHN,
Supervisor, Second District,
County of Los Angeles Board of Supervisors,
Los Angeles, Calif.

DEAR SUPERVISOR HAHN: Your letter of July 16, 1957, to Mr. Colbert was referred to me since, as you know, I am responsible for Chrysler's participation in the cooperative activity on smog.

You raised two important questions: (1) Is the Chrysler Corp. continuing to press as rapidly as possible for a device to reduce pollution from the automobile? (2) Will such a device be available for the 1958 model automobiles?

The answer to the first question is that Chrysler is continuing its efforts on air pollution most energetically. The second question cannot be answered quite so readily. As you know, we are working cooperatively with the air pollution control district on evaluating some of the device proposals. We also have a tremendous amount of data available on traffic study, field surveys, device construction, effects of various devices, etc. The outcome of the evaluation, to-

gether with a joint study of the supporting data, will determine the optimum introduction date.

I expect to be in Los Angeles on August 12, 13, and 14, and I hope to discuss the status of devices with you and the members of the air pollution control district, so that you will have the benefit of all of the information dealing with this subject. After these discussions, the question of introduction date for devices will, I hope, be easier to answer.

I trust this course of action meets with your approval, and am looking forward to seeing you again.

Very truly yours,

C. M. HEINEN,
Assistant Chief Engineer, Materials Laboratories.

GENERAL MOTORS CORP.,
GENERAL MOTORS TECHNICAL CENTER,
Detroit, Mich., July 25, 1957.

Mr. KENNETH HAHN,
Board of Supervisors, County of Los Angeles,
Los Angeles, Calif.

DEAR MR. HAHN: This is in reply to your letter of July 16 addressed to Mr. Curtice concerning the position of General Motors in its attack on the auto exhaust problem in relation to smog in Los Angeles. Your letter was referred to the writer, as Mr. Curtice is away from his office for the month of July.

During the past year, our engineers and scientists have been very actively engaged in pursuing this problem in cooperation with other organizations in the automobile industry. After many painstaking tests in which a great many ideas have been evaluated, our engineers have reached the conclusion that the most practical first step toward reducing hydrocarbon emissions from auto exhausts involves some form of vacuum-limiting device in connection with the carburetor. Although the reduction in hydrocarbons that can be acheieved by this means appears to be disappointingly small, this represents the most constructive principle that we can offer at this time.

Several prototypes embodying this principle as adapted to different makes of automobiles have been turned over to the air pollution control district for experimental evaluation. During the coming month, our industry committee plans to discuss this program with the district authorities with the object of determining the feasibility of proceeding further with this program. I hope that the committee members will have an opportunity to discuss this more completely with you at that time.

Meanwhile, we have been giving considerable attention to some practical means of reducing oxides of nitrogen and of bringing about further reductions in hydrocarbon emissions by mean sof some type of afterburner or catalytic converter in the exhaust system. Although we have very recently had some encouragement from our work on the catalytic converter, it is too soon to say whether this principle can be utilized in a practical way. We are currently engaged in determination of the durability of the catalyst under actual service conditions. Beyond this, we have the problem of achieving appropriate dimensions of a combined converter and silencer that can be fitted within the space limitations of different automobiles once a satisfactory catalyst has been established.

Again let me assure you of our sustained interest in this difficult problem and of our determination to do everything technically possible to keep the objectionable components of auto exhaust at a minimum.

Yours very truly,

C. A. CHAYNE.

EXHIBIT F. REGULATION VII, AIR POLLUTION CONTROL DISTRICT, COUNTY OF LOS ANGELES

REGULATION VII. EMERGENCIES

(Revised 7-26-56.) This emergency regulation is designed to prevent the excessive buildup of air contaminants and to avoid any possibility of a catastrophe caused by toxic concentrations of air contaminants. Past history indicates

that the possibility of such a catastrophe is extremely remote. The Air Pollution Control Board deems it desirable to have ready an adequate plan to prevent such an occurrence, and in case of the happening of this unforeseen event, to provide for adequate actions to protect the health of the citizens in the Air Pollution Control District.

RULE 150. (Adopted 6–20–55) GENERAL. Notwithstanding any other provisions of these rules and regulations, the provisions of this regulation shall apply within the Los Angeles Basin to the control of emissions of air contaminants during any "alert" stage as provided herein.

RULE 151. (Adopted 6–20–55) SAMPLING STATIONS. The Air Pollution Control Officer shall maintain at least fourteen (14) permanently-located atmospheric sampling stations adequately equipped. These sampling stations shall be continuously maintained at locations designated by the Air Pollution Control Officer after consultation with the Scientific Committee. The Air Pollution Control Officer may maintain such additional sampling stations as may be necessary. These additional stations may be permanent, temporary, fixed, or mobile, and may be activated upon orders of the Air Pollution Control Officer.

RULE 152. (Revised 7–26–56) AIR SAMPLING. The Air Pollution Control Officer shall establish procedures whereby adequate samplings and analyses of air contaminants will be taken at each of the stations established under Rule 151.

RULE 153. (Adopted 6–20–55) REPORTS. The Air Pollution Control Officer shall make daily summaries of the readings required by Rule 152. The summaries shall be in such form as to be understandable by the public. These summaries shall be public records and immediately after preparation shall be filed at the main office of the Air Pollution Control District and be available to the public, press, radio, television, and other mass media of communication.

RULE 154. (Revised 7–26–56) CONTINUING PROGRAM OF VOLUNTARY COOPERATION. Upon the adoption of this regulation the Air Pollution Control Officer shall inform the public of ways in which air pollution can be reduced and shall request voluntary cooperation from all persons in all activities which contribute to air pollution. Civic groups shall be encouraged to undertake campaigns of education and voluntary air pollution reduction in their respective communities Public officials shall be urged to take promptly such steps as may be helpful to reduce air contamination to a minimum within the areas of their authority. Employers shall be requested to establish car pools. Users of automotive vehicles shall be urged to keep motors in good condition and to plan routes and schedules which will contribute minimum contamination to critical areas of pollution. All industrial, commercial and business establishments which emit hydrocarbons or the air contaminants named in Rule 156 should critically study their operations from the standpoint of air contamination and should take appropriate action voluntarily to reduce air pollution.

RULE 154. 1. PLANS. a. (Revised 7–26–56) If the Air Pollution Control Officer finds that any industrial, business or commercial establishment or activity emits hydrocarbons or any of the contaminants named in Rule 156, he may give written notice to the owner or operator of such industrial, business or commercial establishment or activity to submit to the Air Pollution Control Officer plans for immediate shutdown or curtailment, in the event of an air pollution emergency, all of the sources of hydrocarbons or any of the contaminants named in Rule 156, including vehicles owned or operated by such person, his agents or employees in the scope of the business or operation of such establishment or activity. Such plan shall include, in addition to the other matters set forth in this rule, a list of all such sources of hydrocarbons and any of the contaminants named in Rule 156, and a statement of the minimum time and the recommended time to effect a complete shutdown of each source in the event of an air pollution emergency. Such notice may be served in the manner prescribed by law for the service of summons, or by registered or certified mail. Each such person shall, within sixty (60) days after the receipt of such notice, or within such additional time as the Air Pollution Control Officer may specify in writing, submit to the Air Pollution Control Officer the plans and information described in the notice.

b. (Revised 7–26–56) The Air Pollution Control Officer shall prepare appropriate plans to be made effective and action to be taken in respect to a First or Second Alert as follows:

(Revised 7–26–56) In respect to a First Alert, the Air Pollution Control Officer shall develop plans calling for the operation of all privately owned vehicles on a pool basis as may be arranged by persons and employers of persons operating vehicle from home to work and in the business of such employer.

(Revised 7–26–56) In respect to a Second Alert, the Control Officer shall prepare a program of action and steps to be taken under the provisions of Rule 158, paragraph c. The general nature of the plans to be made effective upon a Second Alert shall be reported to and subject to review and approval by the Air Pollution Control Board.

(Revised 7–26–56) It shall be the objective of such program to result in bringing about a diminution of air contaminants which occasioned the Second Alert and to prevent any increase thereof in order to protect the health of all persons within the area affected by the alert. It shall also be the objective of such plans that they may be effective to curtail the operations of industrial, business, commercial and oher activities within the basin, but without undue interference with the operations of public utilities or other productive, industrial, business and other activities, the conduct of which is essential to the health and welfare of the community. It is further intended that any said plan of action shall not jeopardize the welfare of the public or result in irreparable injury to any means of production or distribution or the rendering of public utility services.

(Adopted 6–20–55) The Air Pollution Control Officer shall further, by cooperative agreements or in addition to cooperative agreements, prepare plans for action in respect to industry, business, transportation, hospitals, schools and other appropriate public and private institutions, and the public generally, to accomplish the purposes of the Second Alert action as set forth in Rule 158d. The general nature of the plans to be made effective upon a Second Alert shall be reported to and subject to review and approval by the Air Pollution Control Board.

(Adopted 6–20–55) All plans and programs of action to make effective the procedures prescribed in Rule 158, paragraphs c and d, shall be consistent with and designed to accomplish the purposes, and shall be subject to the conditions and limitations, set forth in said paragraphs c and d.

(Adopted 6–20–55) The Air Pollution Control Officer shall give, or cause to be given, wide publicity in regard to plans for action to be applicable under Rule 158, paragraphs c., and d., in order that all persons within the district shall be able to understand and be prepared to render compliance therewith in the event of the sounding of a Second Alert.

RULE 155. (Revised 7–26–56) DECLARATION OF ALERTS. The Air Pollution Control Officer shall declare the appropriate "alert" whenever the concentration of any air pollution contaminant has been verified to have reached the standards set forth in Rule 156.

RULE 155.1 (Adopted 7–26–56) NOTIFICATION OF ALERTS. Following the declaration of the appropriate "alert", the Air Pollution Control Officer shall communicate notification of the declaration of the alert to:

a. The Los Angeles County Sheriff and the Sheriff shall broadcast the declaration of the "alert" by the Sheriff's teletype and radio system to:

1. All Sheriff's substations.
2. All city police departments.
3. California Highway Patrol.

b. Local public officials and public safety personnel, who have responsibilities or interests in air pollution alerts.

c. Air polluting industrial plants and processes which require "alert" data in order to effect pre-arranged plans designed to reduce the output of air contaminants.

d. The general public.

e. All Air Pollution Control District personnel.

RULE 155.2 (Adopted 7–26–56) RADIO COMMUNICATION SYSTEM. The Air Pollution Control Officer shall install and maintain in continuous operation a radio transmitter with selective calling facilities for the purpose of broadcasting the declaration of alerts and information and instructions which may be appropriate to carry out the provisions of this Regulation.

Every person who owns, operates, maintains or uses any:

a. Petroleum refinery.

b. Chemical processing plant, except a plant engaged exclusively in packaging, mixing or blending less than 1,000 pounds per hour.

c. Open hearth steel furnace.

d. Secondary nonferrous refinery.

e. Electric arc furnace.

f. Asphalt saturator.

g. Asphalt paving plant.
h. Ferrous foundry.
i. Nonferrous foundry in which metals other than aluminum, zinc, lead or alloys in which aluminum, zinc or lead is the principal ingredient, are processed, except a foundry in which the throughput does not exceed 100 pounds per hour.
j. Plant manufacturing paint or varnish

shall install radio receiving equipment with decoding device capable of receiving broadcasts from the Air Pollution Control Officer of the declaration of alerts and information and instructions appropriate thereto, and shall properly maintain and operate such equipment during all business hours.

Nothing in this rule shall prevent any other person from installing or maintaining such receiving equipment, subject to the approval of the Air Pollution Control Officer.

RULE 156. A (Adopted 6–20–55) ALERT STAGES FOR TOXIC AIR POLLUTANTS. (In parts per million of air)

	1st alert	2d alert	3d alert
Carbon monoxide [1]	100.0	200.0	300.0
Nitrogen oxides [1]	3.0	5.0	10.0
Sulfur oxides [1]	3.0	5.0	10.0
Ozone [1]	.5	1.0	1.5

[1] How measured: The concentrations of air contaminants shall be measured in accordance with the procedures and recommendations established by the scientific committee.

FIRST ALERT: Close approach to maximum allowable concentration for the population at large. Still safe but approaching a point where preventive action is required.

SECOND ALERT: Air-contamination level at which a health menace exists in a preliminary stage.

THIRD ALERT: Air-contamination level at which a dangerous health menace exists.

RULE 157. (Revised 7–26–56) FIRST ALERT ACTION. This is a warning alert and shall be called declared whenever the concentration of any contaminant has been verified to have reached the standards for the "first alert" set forth in Rule 156. The following action shall be taken upon the calling of the First Alert:

a. (Revised 7–26–56) A person shall not burn any combustible refuse at any location within the basin in an open fire.

b. Revised 7–26–56) A person shall not operate, light, or continue feeding any incinerator after the declaration of the First Alert, except those incinerators for which specific exemption has been granted by the Air Pollution Control Officer in accordance with Rule 162.

c. (Revised 7–26–56) Any person operating or maintaining any industrial, commercial or business establishment other than power plants or heating plants essential to health or safety, which establishment emits hydrocarbons or any of the contaminants named in Rule 156, and any person operating any private non-commercial vehicle, shall, during the First Alert period, take the necessary preliminary steps to the action required should a Second Alert be declared.

d. (Revised 7–26–56) The Air Pollution Control Officer shall, by the use of all appropriate mass media of communication, request the public to stop all unessential use of vehicles in the basin and to operate all privately owned vehicles on a pool basis, and shall request all employers to activate employee car pools.

e. (Revised 7–26–56) When, after the declaration of the First Alert it appears to the Air Pollution Control Officer that the concentration of any contaminants in all or any portion of the basin is increasing in such manner that a Second Alert is likely to be called, he shall take the following actions:

(1) (Adopted 6–20–55) Notify the Emergency Action Committee and request advice on actions to be taken.

(2) (Revised 7–26–56) Give all possible notice to the public by all mass media of communication that a Second Alert may be called.

RULE 158. (Revised 7–26–56) SECOND ALERT ACTION. This is a preliminary health hazard alert and shall be declared when an air contaminant has been verified to have reached the standards set forth for the "Second Alert" in Rule 156.

The following action shall be taken upon the calling of the Second Alert:

a. (Adopted 6–20–55) The action set forth in Rule 157; and

b. (Adopted 6–20–55) The Emergency Action Committee and the Air Pollution Control Board, if not already activated, shall be called into session and shall remain in session or reconvene from time to time as directed by the Air Pollution Control Officer to study all pertinent information relating to the emergency and to recommend to the Air Pollution Control Officer actions to be taken from time to time as conditions change.

c. (Revised 7–26–56) The Air Pollution Control Officer shall make effective, upon notice as provided in Rule 155.1, the program of action to be taken as previously developed pursuant to Rule 154.1, paragraph b, and to carry out the policy stated therein.

(Revised 7–26–56) Pursuant to this alert, the Air Pollution Control Officer may impose limitations as to the general operation of vehicles as provided in Rule 154.1, permitting limited operation essential to accommodate industry, business, public utility, and other services as may be necessary in the public welfare.

d. (Adopted 6–20–55) In the event the control measures made effective under paragraph c above prove to be inadequate to control the increase in the concentration of air contaminants, the Air Pollution Control Officer, with the advice of the Emergency Action Committee and with the concurrence of the Air Pollution Control Board shall take such steps as he may deem necessary to assure adequate control of existing air contaminants and to protect the health and safety of the public, but, if possible, without employing such drastic remedial measures as to completely disrupt the economic life of the community or to result in irreparable injury to any form of production, manufacture, or business.

(Revised 7–26–56) The Air Pollution Control Officer may, with the concurrence of the Air Pollution Control Board, order the closing of any industrial, commercial, or business establishment, and stop all vehicular traffic, except authorized emergency vehicles as defined in the California Vehicle Code, vehicles used in public transportation and vehicles the operation of which is necessary for the protection of the health and welfare of the public, if, in the opinion of the Air Pollution Control Officer, the continued operation of such establishment or vehicle contributes to the further concentration of any air contaminant, the concentration of which caused the declaration of the "alert."

(Revised 7–26–56) The Air Pollution Control Officer, during a Second Alert, shall keep the public suitably informed of all significant changes in the concentration of toxic air contaminants.

RULE 159. (Revised 7–26–56) THIRD ALERT. This is a dangerous health hazard alert and shall be declared when an air contaminant has been verified to have reached the standards set forth for the "Third Alert" in Rule 156.

The following action shall be taken upon the calling of the Third Alert:

a. (Adopted 6–20–55) The actions set forth in Rules 157 and 158, and

b. (Adopted 6–20–55) If it appears that the steps taken by the Air Pollution Control Officer will be inadequate to cope with the emergency, the Air Pollution Control Board shall request the Governor to declare that a state of emergency exists and to take appropriate actions as set forth in the California Disaster Act.

RULE 160. (Revised 7–26–56) END OF ALERT. The Air Pollution Control Officer shall declare the termination of the appropriate alert whenever the concentration of an air contaminant which caused the declaration of such alert has been verified to have fallen below the standards set forth in Rule 156 for the calling of such alert and the available scientific and meteorological data indicates that the concentration of such air contaminant will not immediately increase again so as to reach the standards set forth for such alert in Rule 156. The Air Pollution Control Officer shall immediately communicate the declaration of the termination of the alert in the manner provided in Rule 155.1 for the declaration of alerts. The Sheriff shall broadcast the termination of the alert in the same manner as provided in Rule 155.1 for the declaration of alerts.

RULE 161. (Revised 7–26–56) ENFORCEMENT. When an "alert" has been called the Air Pollution Control Officer, the Sheriff, their deputies, and all other peace officers within the Basin shall enforce the appropriate provisions of this regulation and all orders of the Air Pollution Control Board or the Air Pollution Control Officer made pursuant to this regulation against any person who, having knowledge of the declaration of an alert, refuses to comply with the rules set forth in this regulation or any order of the Air Pollution Control Board or the Air Pollution Control Officer made pursuant to this regulation.

RULE 162. (Revised 7-26-56) INCINERATOR EXEMPTIONS. The Air Pollution Control Officer may exempt any owner or operator of any incinerator from the provisions of Rules 157 and 158 if he finds that the incinerator is used for the destruction of nuisance odors and fumes or that the operation of the incinerator is necessary for the public health or safety, or that the incinerator is of a type described in Rule 2-p and is operating pursuant to a permit issued by the Air Pollution Control Officer.

RULE 163. (Revised 7-26-56) SCIENTIFIC COMMITTEE. A Scientific Committee shall be appointed by the Air Pollution Control Board. Members shall be licensed physicians, medical scientists, biologists, chemists, engineers, or meteorologists, each of whom has had experience in air pollution control work, or other experts with scientific training.

(Adopted 6-20-55) The Air Pollution Control Officer and the County Counsel shall be ex-officio members of the Scientific Committee.

(Adopted 6-20-55) The term of appointment of all members except the ex-officio members shall be two (2) years. The Scientific Committee shall act through a majority. There shall be at least fifteen (15) members on the Committee.

The Scientific Committee shall have the following duties:

a. (Revised 7-26-56) Study and recommend. The Scientific Committee shall study and make recommendations to the Air Pollution Control Board of the most suitable methods for measurement of air contaminants and on any changes recommended for the concentration set forth in Rule 156. The Air Pollution Control Board may adopt such recommended changes for the concentration of toxic air contaminants for each alert staged by amendment to Rule 156.

b. (Adopted 6-20-55) Consult. The Scientific Committee shall serve in a consultant advisory capacity to the Air Pollution Control Officer concerning any air-pollution health problem which may arise. The Scientific Committee shall also advise the Air Pollution Control Board on any recommended changes in this emergency regulation which will provide greater protection of the health and welfare of all persons within the Air Pollution Control District.

RULE 164. (Revised 7-26-56) EMERGENCY ACTION COMMITTEE. An Emergency Action Committee shall be appointed by the Air Pollution Control Board. The Emergency Action Committee shall consist of seven (7) members, and of these members two (2) shall be experts with scientific training or knowledge in air pollution matters, one shall be a licensed physician, one shall be representative of industry, one shall be representative of law enforcement, and two shall be members of the public at large. The term of appointment of all members shall be two (2) years. The duties of the Emergency Action Committee shall be to meet with the Air Pollution Control Officer when called into session, to evaluate data and to advise the Air Pollution Control Officer as to the appropriate action to be taken when the concentration of any of the contaminants set forth in Rule 156 has been verified to be approaching the standards set forth in Rule 156 for a Second Alert.

EXHIBIT G. STATEMENT OF MRS. HARRY BARKELEW, ASSISTANT SECRETARY, BARKELEW MANUFACTURING CO.

BARKELEW MANUFACTURING CO.,
November 5, 1957.

Re direct-fired afterburning muffler.

Representative L. H. FOUNTAIN,
Chairman, Intergovernmental Relations Subcommittee of the House Committee on Government Operations, Washington, D. C.

GENTLEMEN: I am deeply appreciative of the opportunity to address further comments to this subcommittee, for its information and appraisal.

As expressed by Supervisors Kenneth Hahn and Warren M. Dorn, this is the first time we have had the ear of the Government, and even though it was not the correct or plausible time for an individual to speak out, I could not withstand the opportunity to express my thoughts. My apologies.

Harry Barkelew, president of Barkelew Manufacturing Co., a corporation, is the patent holder of the direct-fired afterburing muffler—the only device approved by the air pollution control district. I hope you had time to inspect it in operation on the 20 Los Angeles Transit gasoline buses before you left our city. Mr.

Barkelew was concerned with a meeting at the city counsel's office and could not be present. This meeting was arranged to probe the delays encountered in tests promised by the air pollution control district, and also its manufacture and sale. Upon telephoning and inquiring about test, our lawyer, Mr. Tom Williams, of Matthews & Williams, was informed by Mr. W. R. Linnville, director of the control district auto combustion laboratory, that the test would not take months or weeks, but only days. Four months have elapsed since the APCD's first promise in July to begin tests, and we have not been officially informed of results. Inasmuch as this same-sized afterburner was approved in August 1955, and the laws have been passed by Gov. Goodwin Knight since May 2, 1957, for the APCD to set and enforce standards for auto smog control devices, the production and installation of the afterburner is stymied by lack of information. Mr. William Clayton, of the Clayton Manufacturing Co., our manufacturer, is waiting for knowledge of these standards before submitting other sizes for testing.

I, personally, believe that the moving of the Federal offices from Cincinnati to Los Angeles will bring added weight to decisions and give the whole organization the proper standing with the automotive industry, and others who are not satisfied with its results. We have been reliably informed that General Motors says the afterburner in their laboratory burns continuously. Ford engineers have said they are experimenting with it also. Why the startling "silence" on its use. The APCD tests made in October this year, with instruments recording temperatures on tape, show when testing the afterburner on a Los Angeles Transit Lines gasoline bus on its regular 8-hour run, the inside temperature stayed from 900° to 1,700° continuously. There is a fuel saving of from 10 to 12 percent with use of afterburner, but upon the added use of carburetor control, which is reported to be unsuccessful alone, they work in conjunction perfectly to make added gas savings. The inside temperature range on tape over same testing 8-hour run is consistently from 900° to 1,300° and proves less gas consumption with carburetor control. The outside temperature of usual muffler used on this equipment is 900°, while our afterburner records a reading of from 400° to 500°, which is a safety factor. The package combination of afterburner and carburetor control would then give the public an added incentive to follow the law of installation and cut down materially the enforcement angle to the APCD. At one time in our testing with a transportation company before 1953, we were informed that if a saving of one-half of 1 percent of fuel was proven, all vehicles in question would be equipped with afterburner. Our device has far exceeded this saving in fuel.

This afterburner is made of stainless steel and may last for life of car or truck. This fact is said to be detrimental by the automotive industry as they say their parts department would never stand for this muffler as there would be no replacement sales. No vapor locks will be experienced; back pressure is practically eliminated, adding horsepower to engine performance; and engine maintenance is greatly reduced. Our device needs no apologies for its performance, and upon large-volume manufacture, price can be reduced, as those manufactured to date have practically been handmade. There has never been a price quoted on auto afterburners.

I attach various newspaper articles, also report from the Clayton Manufacturing Co. regarding research on other sizes, the diesels and auto mufflers. One newspaper article reports 24 percent of all United States retail sales now automotive; another speaks of Greyhound and General Motors monopoly on buses, and another denotes gigantic scope of General Motors to small firms, which with added scope of others in Big Three to my mind somewhat spells out the automotive industry's attitude of utter disregard for correction of tremendous volume of smog expended by their products. Would this omnipotent position in the business world also delay the APCD and cause the tests to lag in fear of enforcing the laws in California, against their approval or rejection? The Clayton Manufacturing Co. manufactures four large motor products, and so must of necessity be governed accordingly by the above situation. There is no reason for private industry and inventors to continue research if the APCD and the automotive industry drag their feet.

Mr. William Clayton advised us several months ago at one of our meetings that he had passenger-car afterburners which could be installed in one of the leading car manufacturers' 1958 models. See attached copy of letter of July 9, 1956, on subject. No agreement could be reached with auto industry as to a definite production date with resultant royalty payments.

Note newspaper article attached dated April 1955. Mr. J. C. Zeder, vice president of Chrysler Corp., comments favorably on our afterburner in actual use. This fact should give Robert Chass, director of engineering of APCD, a "red face" for his statement of unsuccessful performance. To date, no auto-sized afterburner has been submitted to the APCD for testing, and I therefore believe his statement was ill advised. This afterburner for autos has been greatly improved since that time.

In meeting October 31, a person behind me during the answers by Robert Chass, remarked "This is just another whitewash, but on a national scale." My scrapbook on the smog problem is showing repetition in research grants and tests at tremendous costs without results. We were told at one time that with our afterburner attached on auto, one could not kill themselves in their garage as exhaust was relatively harmless. A university delayed the first test by APCD on afterburner to induce exhaust gases in greenhouses with plants. The results were not published, but we were informed only one plant showed a slight veining of leaves, which is the accepted theory for smog damage to crops. This is a needed relief in California.

Mr. Berkelew informed me that at council meeting he attended on October 31, Dr. A. J. Haagen-Smit, of California Institute of Technology, remarked that instead of further research for cause and effect, the money so expended would better be used for completion of afterburner.

With the Federal Government's resources and combined facilities of personnel and laboratories located in Los Angeles, a united stand would bring cooperation of the public (as they have already cooperated on removal of incinerators) and also impress the automotive industry with its negligence to conform and provide relief as other industries located in this territory are required to do.

When the intolerable smog situation is cleaned up here and perpetual surface smell of traffic elsewhere is eliminated by use of afterburners nationwide, the remaining sources of smog could then more readily be detected and remedied. Wouldn't New York be happy to eliminate exhaust fumes in their tunnels under the Hudson River?

This afterburner can be used on train diesel engines, and the patents cover its use on any and all combustion engines.

I respectfully submit this report for your consideration.

Very truly yours,

BARKELEW MANUFACTURING CO.,
By Mrs. HARRY BARKELEW,
Assistant Secretary.

The facts stated in the above report are correct and meet with my approval. Upon request, I will give you detailed information on experimental work and manufacture of this device.

HARRY BARKELEW, *President.*

(The enclosures referred to are in the subcommittee files.)

EXHIBIT H. STATEMENT OF GEORGE H. FISHER, INDUSTRIAL ENGINEER, SOUTH GATE, CALIF.

SOUTH GATE, CALIF., *November 2, 1957.*

Mr. JAMES R. NAUGHTON,
Counsel, Intergovernmental Relations Subcommittee, Committee on Government Operations, House Office Building, Washington, D. C.

DEAR MR. NAUGHTON: This letter is an answer to the kind invitation of your committee to submit an informal contribution to its Los Angeles hearing into smog-control expenditures. I am making this a personal report rather than an officially approved one from the California Clean Air League because I don't want to be too late in getting it into the hands of your committee—which seems to be proceeding without procrastination.

Let me say at the outset—and this is by way of summary of our entire position in the matter—that we heartily agree with the Los Angeles Board of Supervisors that Federal money should, in fact that it must, be introduced into the smog-control picture in California if anything like a realistic approach is to be made to the combating of our air-pollution problem. However, where we differ dramatically with the board is that we are convinced all such funds will merely be "down the drain" unless they are specifically earmarked for use in a legal

effort to compel the smog producers to stop producing smog. (Taxation of smog-producing petroleum products suggests itself as a practical avenue of approach at the county level.) To combat a powerful lobby in the enactment of needed legislation a costly publicity program with earmarked funds is the public's only chance.

As the men of science indicated yesterday the Los Angeles "photochemical smog" problem is an extremely simple one—but one that has been blown up into unmeasureable and unwieldy proportions by deliberately confusing it with the general, age-old, worldwide air-pollution problem—as an excuse to escape the responsibility of solving it locally. As an attempt to establish this basic fact in the minds of your committee I am taking the liberty of presenting below a thoroughly documented history and analysis of the "Los Angeles Smog Story." All reference numbers (footnoted at the end of the story) are documents readily on file in any well-stocked public library.

THE LOS ANGELES SMOG PROBLEM

On the afternoon of July 26, 1943, the usual parade of homecoming sports fishermen proceeded northward along Gaffey Avenue, in Wilmington, Calif. As they passed the Union Oil Co. refinery at Anaheim Street their attention was arrested by a peculiar blue-gray haze which seemed to have settled over Bixby Slough in the foreground immediately ahead, where the road swings leftward to circle the great hole in the ground.

For on that Monday morning the great refinery, seeking to increase its yield per barrel of crude had initiated its new catalytic cracking method of refining gasoline. The new method was the work of Eugene Houdry, who had also designed similar cracking plants for eastern refiners. As Dr. Houdry testified later,[1] he had duly advised his clients when he sold them the process that certain precautions must be taken to avoid the toxic mist (which Los Angeles citizens soon learned to call smog) which was incidental to the new system of refining. He explained that he had provided his eastern clients with these safeguards[2] with the result that the air above their plants had remained quite clear.

THE ORIGIN OF "CATALYTICALLY PRODUCED PHOTOCHEMICAL SMOG"

As one refinery after another converted to catalytic cracking, under the constantly increasing pressure of wartime demands for more and more gasoline and residual fuel oil, the toxic blanket of smog soon spread over the entire Los Angeles Valley. And because of the basin-like topography and the strong sunlight for which southern California is famous (plus several other, and more technical, metorological factors) the strange new haze lingered over the valley on particularly windless days, pressing against the mountains on the north and east and all but suffocating the residents of the foothill towns which nestled at the valley's rim.

The basic cause of the scourge carries us back to the emergence of the automobile and its rapid growth as a dominant appurtenance of American life. We Americans are much like spoiled children where our rich natural resources are concerned. Because we have always seemed to have plenty we have wasted them with reckless abandon—grabbing and tearing them from nature's bosom in our greed to beat the other fellow to the draw. Our wornout farms, our butchered-up timberlands, our ravaged mines—all stand in mute, shameful witness to our dog-eat-dog prodigality.[3]

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[1] From a statement made by Dr. Houdry in the office of Mayor Warren M. Dorn, of Pasadena, now a member of the Los Angeles County Board of Supervisors and chairman of its air pollution committee.

[2] In a letter to the Los Angeles City Council, Ernest E. Debs, a member of that body, relates his conversations with Dr. Houdry while visiting a refinery of the Sun Oil Co. at Marcus Hook, Pa. The refinery, an installation by Dr. Houdry, was entirely free of smog.

[3] "The size and magnificence of the American inheritance and the rapidity and wantonness with which it has been squandered are an almost incredible commentary on human folly. On no country, perhaps, had 'affluent Fortune emptied all her horn' in such varied and bountiful profusion, and no country could have shown itself more utterly ungrateful. The Americans have dealt with their resources, and deal with them today, in the pioneer spirit of sheer, unmitigated pillage. * * *"—E. MACKAY EDGAR, British petroleum engineer.

But the waste of our petroleum resources has been the most costly of all our national wantonness.[4] In order to monopolize a pool of oil, we have drilled a hundred wells where just one, carefully spotted, would have spelled the difference between waste and conservation—and also between a bounteous supply of pure, clean-burning gasoline for today's engines, and the sulfur-bearing, smog-producing stuff we are forced to use nowadays instead. In our haste to seize the last drop for ourselves before our neighbor across the fence should suck some of it out through his own pumps on his side, we have increased the number and speed of our pumps until the resulting turbulence below churned up an ever-increasing amount of filth.

With each new field we exploit, we find ourselves having to go deeper and deeper into the bowels of the earth—constantly dredging up dirtier and dirtier crude oils,[5] which not only adds to the cost of the refining process but continuously increases the inevitable byproduct, "catalytically produced photochemical smog." (This elongated name, by the way, described the only kind of air pollution that has ever been suggested as being toxic to plants or animals in the Los Angeles area.[6]

In spite of its potential toxicity, the steadily worsening fuel oils have been more or less readily adaptable to our diesel trucks and buses and our industrial burners. However, with our automobiles it was a different story. Plugs, rings, valves, and carburetors and fuel lines corrode and jam from the foul, noncombustible impurities.

Determined to reduce the ever-increasing cost of refining out the constantly growing number and amount of these harsh chemicals [7] (which are predominantly sulfurous in nature)[8] the refiners discovered it was easier and cheaper "to put something in than to take something out." The use of "additives"—in the form of new poisons to counteract the native ones—soon became the dominant practice. The inevitable result was that the density, and, what was worse, the toxicity, of the resulting smog was enormously stepped up. (Bromine, chlorine, and tricresyl phosphate—Shell's "TCP"—were introduced to clear up the trouble caused by tetraethyl lead, which was used to clear up the trouble caused by sulfur and nitrogen compounds. Thus, the refiners currently find themselves in the position of a physician who constantly increases the dosage of drugs to a suffering patient, until a saturation point is reached—a plateau of "diminishing returns.")

What is more significant is that tetraethyl lead, the first and most important of the additives, soon lodged itself as a permanent boarder in the economy of gasoline marketing,[9] through a shrewd program of advertising. A highly profitable subsidiary jointly owned by Standard Oil and General Motors, its position in the economics of gasoline production has made it an obstacle blocking the road to smog-free air and pure, unadulterated fuels.[10]

In August 1955, the Southwest Research Institute submitted its report No. 10 to the Los Angeles Air Pollution Foundation (a group of petroleum and business leaders of California). This report cited several fuel substitutes for eliminating the smog problem in Los Angeles County, substitutes which dispensed with the universally used, smog-producing tetraethyl lead.

It was clear that such nonlead solutions to the smog problem were not acceptable to the interests which had become entrenched in the gasoline-marketing picture. No publicity was accorded report No. 10, and it has not been heard of since

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[4] "The grave waste of capital and of irreplaceable resources that obtains in this (petroleum) industry inhere in the economic organization of the industry, including multiplicity of ownership and operating units and the legal framework—that is, the rule of capture—within which the industry must operate. Consequently, the responsibility for this waste must be assessed against us all collectively; that is, against Government, including the courts, since Government must determine this framework"—Ralph J. Watkins, economic adviser to the National Resources Planning Board.

[5] Automobile Guide, published by Theo Audel & Co., New York, p. 533.

[6] Automobile Exhaust and Smog Formation, by W. L. Faith, in Air Pollution Control Journal, May 1957.

[7] Race for Higher Octanes Changes Oil Refining, Business Week, July 7, 1956.

[8] Air Pollution Handbook, McGraw-Hill, p. 33.

[9] "Did you ever stop to consider what caused this tremendous growth? (Ethyl Corp., referring to its rapid rise.) One reason we can think of is the continuous year-in and year-out advertising and promotion of 'Ethyl' gasoline by Ethyl Corp. * * * In the years ahead, millions of new car owners will come into the picture. These people, too, must be sold if this market is to be maintained. That's why Ethyl's plans for the future include an expanding advertising and promotional effort, plus a wide variety of dealer educational programs" (National Petroleum News, January 28, 1953).

[10] See *Ethyl Gasoline Corporation* v. *United States*, 309 U. S. 436 (1940); Stocking and Watkins, pp. 472–473.

a tiny squib in a remote corner of our newspapers announced crisply that it had been duly received.

Specifically, the report stated (referring to the most promising of the solutions offered):

"It is estimated that nonleaded gasoline with octane numbers of 92 for premium grade and 81 for regular grade could be made available in sufficient amounts to satisfy the demand in Los Angles County. * * * It is estimated that the cost of 92-octane unleaded gasoline would be 1 to 2 cents per gallon more than the existing price of that grade * * *." (The report notes, however, that under this substitution all the gasoline sold elsewhere would have to use the maximum allowable limits of lead—in other words, the obstacle was an economic, not a technical, one.)

In another section, the report describes a new fuel possibility but stipulates that, if employed, "a new market must first be found for the output of the local refineries' present production."

However, report No. 10 was not needed to inform the petroleum industry that clean-burning unleaded gasoline was a practicality. For many years the American Oil Co. (a Standard subsidiary) has been manufacturing such a fuel for eastern markets—remote from California where its sister company is determined to exploit the cheap local crude that prevails in the Southwest. Nevertheless, under interogation, Executive Vice President L. W. Moore, of American Oil, in a letter to the Los Angeles Smog District, stated:

"It is true that this company manufactures and sells a water-white, unleaded, high-octane motor fuel. * * * Our experience with unleaded fuels goes back over a period of over 35 years * * *."

But quite independent of the Southwest Research Institute and its findings, and quite independent of the experience of American Oil in producing unleaded fuels, the staff scientists of the Los Angeles Air Pollution Control District themselves have developed their own formulas for clean-burning fuels. They have submitted these formulas and samples of fuel to the Department of Mines Test Laboratory at Bartlesville. The results were to have been reported many months ago, yet nothing has ever been heard of these tests—just as nothing was heard of all former efforts to actually clear out our smog-producing gasoline and fuel oils.

After 14 years of suffering under the menace of smog, Los Angeles citizens have grown weary of the battle. Only the most naive among us still believes that the problem is still a technical one rather than a political farce.

"CATALYTIC SMOG"—LOS ANGELES VARIETY

The joining of many factors caused the Los Angeles Basin to be singled out as nature's prime smog caldron. The strong sunshine, the mountain-ringed valley, the absence of high winds, the inordinate number of autos, trucks, buses, oil-burning industry, and powerplants. Yet, the most basic of all—and one that is most frequently lost sight of—is the fact that the great, arid Southwest produces the "sourest" crude oil in the world.[11]

The southwest corner of the United States has enjoyed no adequate rainfall to "leach down" the harsh, crustal impurities deep into the earth. Early California historical writings tell of the "uncommonly foul-smelling liquid" that was encountered everywhere when roaming shepherds dug for water for their thirsting flocks.[12] Natural "bad oil" as well as "bad water" seems to have become a tradition in this neck of the woods. Those of us who have a special distaste for "hard" water will frequently be found paying a premium price to get "eastern" beer—just as the more particular motorist will pay a premium for "eastern" motor oil. However, due to our natural economic isolation from eastern and Midwest markets, we find that eastern gasoline for our cars is not available at the corner filling station.

And so, as a perusal of local postwar-era newspapers will disclose, since its inception there has been no mystery in the minds of the people of Los Angeles as to the source of the smog that kept burning their eyes, choking their throats, and giving them rasping coughing spells. And yet, not until December 1950 was there available the scientific proof of the source of local smog to justify preparation of legal action in a court of law. Toward the end of the seventh year of our sunlight-induced smog, Prof. A. J. Haagen-Smit, biochemist at the Cali-

[11] Air Pollution Handbook, McGraw-Hill, p. 31.
[12] Richard J. Neutra, in Frontier Magazine, February 1957, p. 14.

fornia Institute of Technology produced authentic samples in his laboratory of the same bluish-gray, eye-smarting, plant-killing mist that had become so familiar to the nostrils of every Los Angeles County citizen.[13] In due time his historic theory was verified by fellow scientists at Stanford University[14] and today it forms the basis of local smog studies by every serious student of the subject.

There was no dearth of plaintiffs to bring suits for damages to field crops, and the ensuing years saw many cases come to trial against the great refineries.[15] However, the dominant role played by the petroleum industry in the economic life of California was soon made manifest in these ridiculous "kangaroo type" courtroom scenes. For, just as in other oil-producing States like Pennsylvania, Texas, etc.,[16] the influence of King Petroleum is reflected in the political[17] and educational[18] life of the community. Expert witnesses, quite suddenly, were as hard to dig up as tough-minded prosecutors.

CRISIS IN THE COLD WAR AGAINST SMOG

The first 5 years after Professor Haagen-Smit's historic theory was enunciated were marked not only by misfiring lawsuits but also by grand jury accusations of dereliction of duty against smog-control authorities and other legalistic miscarriages aimed at the public officials who were openly turning one face to their constituents and another toward the great petroleum industry, whose lush research contracts were already beginning to change the attitude of many of the scientists involved.[19]

The apparently insurmountable resistance of the oil interests produced a very concrete stalemate in the war against smog and the air-pollution control district

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[13] The Air Pollution Problem in Los Angeles, by A. J. Haagen-Smit, in Engineering and Science magazine (California Institute of Technology, December 1950).

[14] The Smog Problem in Los Angeles County (Stanford Research Institute, January 1954, pp. 5 and 131).

[15] See the Reporter, December 30, 1954, p. 30.

[16] "It may not be a wholesome thing to say, but the oil industry is in complete control of the State government and State politics. The income from the oil industry is so great and the avenues and outlets of its influence so numerous and so far flung it can bring about any governmental program behind which it unites and defeat any program against it"—Robert W. Calvert, 1947 chairman of the Texas Democratic Party (introducing a member of the Texas Railroad Commission to the Lions Club in Hillsboro, in the spring of 1947.

[17] "The Capitol today is swarming with greasy-fingered oil lobbyists who, as usual, have crackling greenbacks to spend in quarters where they will do the most good. What they dearly want, at whatever price, is another quitclaim bill which will convey ownership of the offshore oil lands away from all of the people, thereby losing the taxpayers literally billions of dollars that might be used on the education of their children. Slick operators want to enrich themselves at the expense of the children. * * * Oil continues to befoul the pure stream of our democratic power"—Harold Ickes (in reply to a series of articles in the Dallas Morning News, which ran during March 1951).

[18] See Summary Report of Conference on Corporate Contributions to Higher Education (published by the Council for Financial Aid to Education, April 1955). The conference was held under the sponsorship of the Council for Financial Aid to Education, a group of leaders of large business firms. Its purpose is to stimulate interest in corporate aid to schools, taking advantage of new income-tax-deduction privileges written into the 1954 tax laws.

In 1954 the Federal income-tax law was changed to allow corporations to donate 5 percent of their net income to educational institutions at very little cost to themselves. Only 18 percent actually comes out of their own cash drawers, while Uncle Sam pays the balance (see Internal Revenue Code, sec. 170).

In the following year (1955) Chairman Frank W. Abrams of Standard Oil of New Jersey gathered leaders together from other giant corporations to put corporate giving to schools on an organized basis. The council has managed to step up gifts to schools from a quarter of a billion dollars in 1950 to half a billion in 1956. Each firm makes its own decisions as to which schools to support and the support can be withdrawn at the pleasure of the donor. Fellowships for writing histories of oil companies, research contracts, and special part-time work in industrial plants are part of the give and take entering into the arrangements between donors and school.

An atmosphere of somber, scholastic dignity was lent to the conference through the cosponsorship of Columbia University Graduate School of Business. Preamble to the conference report was written by the dean of the graduate school—who turns out to be none other than Courtney C. Brown, former head of Standard Oil of New Jersey's publicity department. The switch was made after Dr. Grayson Kirk, a director of Socony-Vacuum succeeded Dwight Eisenhower as president of Columbia University.

Clearly the term "independent university" has less significance today that prior to President Eisenhower's 5 percent gift deduction was written into the tax laws of the United States.

[19] "Even with all the original fanfare of publicity, the completeness of her original surveys of sources of pollution, and her supposedly all-out efforts at control, Los Angeles is actually experiencing a yearly worsening of her pollution problem instead of the relief she had hoped for. Today there is strong suspicion that her pollution control authorities have come under the effective dominance of the industrial forces whose pollution output they are supposed to abate"—Air Pollution and Community Health (p. 133) by Dr. Clarence A. Mills, M. D., Ph. D. (pioneer student of American air pollution and outstanding authority on medical aspects of smog).

recognized that something equally concrete must be forthcoming to satisfy the rising tempers of the smog-choked citizenry, since even the governor's plea for a 2-week shutdown of the refineries as a test failed to gain the cooperation of the refinery operators.

A standard political maneuver was rushed into the breach. The whole matter of demanding that the refiners refine the gas, in effect was tabled indefinitely by referring back to committee for further study, as it were. Investigation revealed that air pollution (as contrasted with Los Angeles catalytically produced photochemical smog) was an ancient and worldwide problem. Particularly since James Watt began peddling his steam engines a couple of centuries ago a steadily increasing body of science and technology have been built up to deal with the endless types and varieties of industrial emissions.

Numerous control devices have been installed—in proportion to the degree of enforcement that local health departments have been able to impose against the corporate interests involved. Manufacturers of filters, precipitators, baghouses, blowers, scrubbers, strainers, absorbers, etc., advertise their wares in the Jounal of the Air Pollution Control Association (which, before Los Angeles put smog on the map was modestly called air repair). The Journal has now been catapulted into the ranks of a highly technical engineering chronicle, in which industrial chemists, metalurgists, physicists, and engineers write learned papers at one another covering highly academic and abstract air-pollution subjects.

The Air Pollution Control Association itself has developed into a broadly conceived engineering society, holding swank annual conventions attended by technical, scientific, and political air-pollustion specialists as well as by the control-device trade itself which uses the conventions to push the various brand names. In no small measure the association has helped make America air-pollution control conscious.

Thus from a small beginning in a remote corner of the Nation air pollution as a national institution has chain reacted into worldwide prominence—not as a nuisance to be sumarily stamped out by local health departments but as a novel means for local politicians to get fresh toeholds on some governmental money tree. National air pollution headlines in newspapers nowadays deal principally with a community's efforts to induce their public servants to act against an offending industry, and the public servants' efforts at wheedling more funds from their disgusted but apparently helpless constituents.[20]

THE FEDERAL GOVERNMENT MUST CHANGE THE DIRECTION OF THE LOS ANGELES SMOG CONTROL EFFORT

As indicated at the beginning of this report, only by specifically earmarking Federal funds for use on the legal front can new Federal money be utilized constructively; and the current ratholing of public finances apparently can be halted only by such gesture from the Congress of the United States. Taxation of smog-producing petroleum products at present appears the most practical of such legal weapons.

A brief résumé of the current projects of the Los Angeles Air Pollution Control District program—and of its completely negative results as of this date—demonstrates in convincing fashion why a complete about-face in local procedure is essential:

1. *Inspection.*—Industrial emissions are checked according to the Ringelmann smoke chart even though the district's own engineers admit that the sought-after smog poisons are invisible.[21]

2. *Enforcement.*—Forty-eight million dollars worth of home incinerators were scrapped by an order of the district without due process of law [22] although the district's chief research scientist admitted that well-designed incinerators could have been substituted whose effluents would be quite harmless.[23]

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[20] See the national newspaper-clipping file on smog compiled by the air pollution committee of the American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.

[21] The Ringelmann smoke density chart consists of four different pieces of mesh of various courseness. By holding each screen toward the sky alongside a smoking chimney, a "grade" of smoke density is theoretically determined. The Ringelmann chart was designed half a century ago for smoke abatement work in coal-burning communities and has no actual applicability in Los Angeles County, where smog poisons are invisible.

[22] From a statement by Smog Control Director Griswold in a televised statement over channel 11, KTTV, on Thursday, October 31, 1957, at 6.30 p. m.

[23] "Dr. Chambers explained that when rubbish is completely burned the only byproducts admitted to the air would be carbon dioxide, a harmless gas, and water"—From an APCD press release June 10, 1956.

3. *Research.*—Millions of dollars in research projects have been instituted in violation of section 22, article 4, of California's constitution, which forbids spending of public money for private benefit. These researches have dealt with matters which are clearly in the interest of specific industries only—matters relating to production and housekeeping problems within their plants.[24]

4. *Engineering*—Putting the cart before the horse, the design of "an auto exhaust device" has occupied this division, although the auto industry (which has a virtual monopoly of top technicians in this field) voices no optimism in this direction.[25] A 10-year pattern of misrepresentation and deceit has accompanied the pursuit of this phantom "afterburner" which purports to "stop smog at the source." [26]

5. *Legislation.*—The district is impotent against the powerful Sacramento lobbies. On April 10, 1957, legislative tempers flared up against this corporate interference with lawmaking. Assemblyman Bruce Allen, chairman of the judiciary committee declared on the floor of the lower house that "the oil industry is the most vicious influence in California politics," [27] after which an assembly committee voted out a bill forbidding financial contributions from the oil industry to candidates for election to this body.[28] The bill eventually was vetoed by the Governor, however,[29] and a few days later the Richards bill (the key piece of smog legislation in this year's session) was defeated because it set up regional instead of local control. One lone lobbyist was able to block its passage—even after its author pleaded that the bill contained "no actual enforcement provisions but was merely a provision to coordinate research." [30] It should be explained here that Senator Richards was serving his freshman term and might be forgiven for not understanding that oil lobbyists must approve all oil legislation.

However, a more competent legislative department at district headquarters might have saved the very crucial smog-control legislation as well as prepared the inexperienced young senator against "sticking his neck out" for the lobbyist to lop off.

6. *Education.*—The smog-control district maintains its own printing establishment to handle its vast public relations program. Admittedly the program is designed to dispel the "bad publicity concerning financial compensation of smog-control brass." [31]

CONCLUSION

Federal aid to smog control in Los Angeles should be concentrated on the problem of finding legal means to enforce the provisions of the State's Health and Safety Code which prohibits pollution of the atmosphere from any source. Contributing funds for any other unspecified purpose would be merely prolonging and enriching the present 14-year-old hoax under which a helpless local citizenry is being cynically exploited. There are no political parties in county politics—no civic organization with voice enough, in our swiftly spreading and highly mobile population concentration, to bring the power of the citizens into focus. It is increasingly apparent that only with Federal assistance—carefully directed—can Los Angeles pull itself out of the scourge of smog.

Very truly yours,

GEORGE H. FISHER.

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[24] See the Report of Hearings on Proposed Los Angeles County Budget (June 11, 1957), at which objections were raised but not answered as to the propriety of many proposed research projects of the air pollution control district.

[25] In the September 1955 issue of California magazine, Director Griswold states that "Chrysler, Ford, and General Motors all have (auto exhaust devices) ready for next year's models."

[26] But in a press release dated August 17, 1957, all auto makers jointly deny that any prospect exists for the perfection of such a device. (These denials have been periodic since Griswold's first "demand" for this imaginary gimmick was presented to the auto makers more than 7 years ago.)

[27] California State Assembly Daily Journal, April 10, 1957.

[28] California State Assembly Daily Journal, April 11, 1957.

[29] California State Assembly Daily Journal, April 12, 1957.

[30] California State Assembly Daily Journal, April 11, 1957.

[31] See Air Pollution Control in the County of Los Angeles, published October 1955 by the Los Angeles Air Pollution Control District, chief administrative office (p. 113).